

UNITED FRUIT COMPANY

General Offices: Boston, Massachusetts

Medical Department

TWELFTH
ANNUAL REPORT



1923



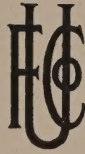
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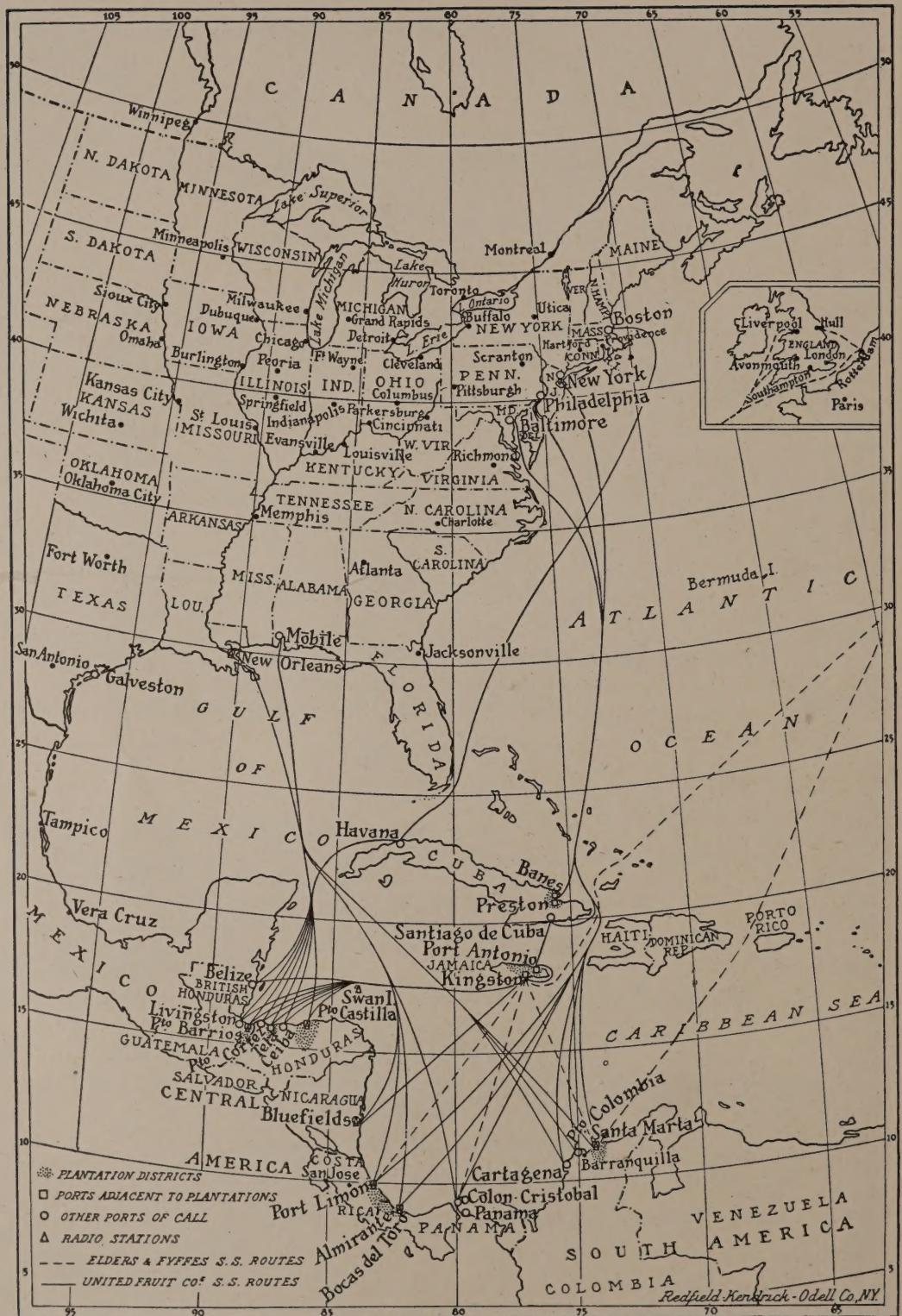
SECTION VI

NOTES ON SOME OBSERVATIONS MADE IN THE GUATEMALA, TELA AND TRUXILLO DIVISIONS

December, 1923, and early January, 1924

By DR. M. A. BARBER, United States Public Health Service

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SECTION I

UNITED FRUIT COMPANY

GENERAL OFFICES, 131 STATE STREET, BOSTON, MASS.

WILLIAM E. DEEKS, M. D.
GENERAL MANAGER

MEDICAL DEPARTMENT
17 BATTERY PLACE, NEW YORK

March 1, 1924.

A. W. PRESTON, Esq., President,
United Fruit Company,
Boston, Massachusetts.

Dear Sir:—

The Annual Report of the Medical Department of the United Fruit Company for the fiscal year ended December 31, 1923, is herewith submitted:

The United Fruit Company has considerably increased the area of its cultivations in the Tropics, and in consequence the number of its employees in some of the divisions. These changes have in turn necessitated some increase in the personnel of the Medical Department, as well as in the hospital and dispensary facilities for the care of patients.

Marked improvement has been evidenced in the work of the Pathological, Laboratory and X-ray departments, and further constructive work is progressing favorably. The examination of pathological tissues sent from the hospitals in the Tropics to the Consulting Pathologist, Dr. F. B. Mallory, in Boston, has revealed some interesting findings; these appear in a special report in Section V.

The laboratory in the Tela Hospital is now thoroughly equipped, and under the direction of Dr. Herbert C. Clark much of value has been accomplished during the past year. Because of its comprehensive scope his laboratory report has been given a special place in Section V. Dr. Clark gives an excellent summary of the diseases met with in the Tela Railroad Division, where conditions are fairly typical of those existing in all our divisions. Dr. Clark, too, has made some surveys relative to the incidence of malaria, syphilis and other diseases, and his findings along these lines appear in special reports, also in Section V.

The technical work in all the laboratories has greatly improved. Miss Lois Cutter, Traveling Laboratory Technician, has spent considerable time in each laboratory, teaching the local technicians the most up-to-date methods in routine examinations, and arranging to provide them with proper equipment. The laboratory work in the Tropics is of particular importance, not only in the diagnosis of diseases, but also as a medium for research. In order that this branch of the Department may be still further developed, the position of Consultant in Laboratory and Medical Research Work has been created, and we are pleased to announce that Dr. Richard P. Strong, of the School of Tropical Medicine, Harvard University, has consented to fill the new post.

At the solicitation of the Medical Department, Dr. M. A. Barber, of the United States Public Health Service, during the year undertook a brief survey of the incidence of malaria and of the sanitary conditions in the divisions of Honduras and Guatemala. Some of his observations are of special interest; his report is referred to in detail in Section VI.

X-RAY

All the hospitals except those of Santa Marta and Puerto Castilla are now equipped with X-ray apparatus. The equipment for the former will soon be installed, and for the latter when the new hospital is completed. The Port Medical Office in New York has also had an X-ray apparatus installed; and it has proved to be very serviceable.

DENTAL SERVICE

It is realized that if our employees are to maintain a perfect state of health their teeth must be kept in good condition. With this object in view, arrangements have been made in all our divisions to enable our employees to procure competent attention.

PERSONNEL

There have been a few resignations from the medical staff, but the resulting vacancies have been satisfactorily filled. Moreover, some additional appointments have been made.

NURSING STAFF

The policy of replacing some of the white registered nurses with qualified trained nurses from the hospitals in Jamaica and Panama has proved highly satisfactory. White nurses are now in charge of the nursing work of the hospitals. They also supervise the routine work carried on by the native nurses, who understand local conditions better than white nurses and have no scruples against caring for the native laboring population.

BUILDING OPERATIONS

BANES (Cuba)

An annex to the old hospital has been constructed to provide consultation, dressing and waiting rooms, and a dispensary. A convalescent ward has been converted into a well-appointed laboratory, with X-ray rooms, and has been completely equipped. New quarters for orderlies have been constructed and the old ones have been renovated. Provision has also been made for quarters for colored nurses, and improvements have been made in the medical wards.

PRESTON (Cuba)

In this division the area of the Hospital reservation has been enlarged by the removal of old buildings. The grounds have been parked and have been planted with fruit and ornamental trees. Improvements have also been made in the staff quarters.

COLOMBIA

During the year a new ward was opened and furnished, and other additions and alterations were made for the improvement of the laboratory and hospital-dispensary service. An X-ray room has been arranged for, and will soon be equipped. The development in this division has necessitated making increased provision for ward patients; at present there is under construction a building that will provide accommodation for sixty additional beds. Arrangements have also been made for an extra supply of good potable water for hospital purposes.

TRUXILLO RAILROAD (Honduras)

Pending the completion of the new hospital, it became necessary to add a fifty-bed ward to the hospital in Puerto Castilla as well as to that in Prieta. It is believed that with the completion of the new hospital, which will accommodate 240 patients, it will be possible to abandon the Prieta Branch Hospital. To do so should effect a considerable reduction in hospital costs and also increase the efficiency of the hospital operations. An automatic flushing sewage system was installed in one-half the labor section of the town of Puerto Castilla, and arrangements have been made to complete the work in the other half.

TELA RAILROAD (Honduras)

During the year three important additions were made to the hospital building: (1) An extension providing for twelve beds for first-class female patients; (2) an extension providing accommodations for seventeen beds for second-class female patients, and eight cribs for children; and (3) a new two-story building, the

upper floor of which is used for an X-ray laboratory and the lower floor for an isolation ward.

A silent-signal system installed in the Hospital has greatly facilitated the work of the nursing staff.

Dispensary facilities have also been increased. A new dispensary was built in the Progreso District, and the dispensary car was moved from there to the Guimas District, which is at present under development.

Work has been begun on the installation of an automatic flushing sewage system designed to serve that part of the town of Tela which is occupied by laborers.

PANAMA

The new ward for colored women, completed and occupied in May, not only has proved entirely satisfactory, but has popularized hospital treatment among this class of patients. On several occasions its capacity has been tested, but so far it has proved adequate. While this new ward was formerly planned for twenty-six beds, there is comfortable space for thirty, so that unexpected demands can be met. The size of the laboratory has been doubled by the inclusion of the adjoining veranda.

The building for medical and surgical supplies was completed and occupied in December. The morgue has been enlarged to meet requirements for more efficient scientific work, and the Hospital also has undergone certain alterations which have improved the facilities in administration.

GUATEMALA

The staff quarters have been increased by the erection of two new buildings for the accommodation of married doctors.

COSTA RICA

Two new dispensaries have been erected and equipped, and improvements are under way to increase the facilities of the Hospital dispensary service as well as those of the staff quarters.

JAMAICA

In Kingston the Hospital dispensary building has been enlarged to meet increasing requirements.

WATER SUPPLY

Since it is an established fact that a number of diseases, particularly typhoid and dysentery, can be conveyed through an impure water supply, there is nothing more important to the health of our employees than good potable water. At

the present time in all the divisions the supply is satisfactory. In all the larger towns the water is piped from reservoirs, into which water collects from uninhabited areas. At the same time, for household purposes we must frequently rely upon rain water collected from the roofs of buildings into mosquito-proof tanks. We have also found that in many instances it is possible to drive wells and obtain a very satisfactory supply, which can be withdrawn by means of pumps or windmills. There were a few cases in which the water was taken from rivers, and the installation of filtration plants became necessary.

The work done by the Truxillo Railroad Division during the past year affords an excellent illustration of the difficulties incidental to the furnishing of supplies of potable water. An eight-inch pipe line $12\frac{1}{2}$ miles long was constructed, to supply Puerto Castilla; and an earthen storage reservoir with a capacity of from 16,000,000 to 17,000,000 gallons of water is under construction, for use in the dry season. The site of the reservoir is in the foothills on the Trujillo side of the bay. Every effort is being made to guard against any possible contamination of this important reserve supply.

At Corocito Junction a pipe line some four miles long was laid to furnish a water supply to the population at that point, as well as to the farms on the west branch of the Aguan River in the New Chapagua District. Another gravity line, five miles long, was constructed at Taujica, for the benefit of the population at that point; also, one was laid down at Zamora, four miles long, to supply the farms in that area and the farm camps situated for two miles along the railway. Two more such lines are projected. In places where gravity water-supply systems are not practicable, reliance is placed upon supplies furnished from wells by pumps or windmills. It is proposed to install several more windmills during 1924, in order that an abundance of good water may be obtained.

In some places it was found that the water from these wells was not fit for human consumption, owing to the large amount of decaying vegetable matter. For the removal of this foreign matter a system of sand-and-charcoal filters has been constructed. The delivery pipe from the windmill discharges the water upward into the air, thus insuring aëration, and the water then falls back into a Panama tank, the top of which is covered with screening. Through this tank, filled with either sand or charcoal, the water is filtered and then, the impurities having been thus removed, the potable water is piped to a storage tank a few feet below. From that point it is piped to the houses and camps. In this way a supply of pure water is obtained from what at first appeared to be an impossible source. The whole filtration plant cost only about \$150.

SUMMARIZED STATEMENT OF THE WORK DONE BY THE MEDICAL DEPARTMENT

As will be seen in the Table of Vital Statistics:

28,398 cases were treated in the hospitals

227,545 treatments were given in the dispensaries

10,170 cases were treated on the steamships

4,282 cases were treated by the Port Medical Officers

1,406 candidates were examined for employment, of whom 99 were rejected

100 steamships were fumigated throughout, and in addition the holds of 3 steamships and 51 separate rooms or quarters

In Section III conditions which relate to the incidence, treatment and mortality of the principal diseases are considered in more detail.

SANITARY CONDITIONS

The sanitary work in the Tropics not only has been well maintained, but has been greatly extended because of the increased acreage under cultivation. Drainage, grass-cutting, screening of houses (particularly those of the white employees), garbage destruction, sewerage installation for communities, larviciding by means of oil and Paris green, and provision for supplies of potable water, are all now routine measures considered essential to the maintenance of health. In some divisions the screening of houses for the protection of the better class of native labor has been undertaken. This procedure is justifiable where the laborers are sufficiently intelligent to appreciate the value of screening and to keep the screens in order.

In the steamship service the sanitary measures that have been adopted are producing satisfactory results, but constant vigilance is necessary. Complete cyanide fumigation of vessels, for the destruction of rats and small vermin, is periodically effected; and follow-up measures for destroying vermin by the use of live steam, roach powders and other insecticides are more or less constantly in use.

FREE RADIO-MEDICAL SERVICE

The radio-medical service established by the Company furnishes free consultation for all steamships not carrying doctors, with its land hospitals and with its steamships having Company doctors aboard. This work has proved of real value. Frequently much needed measures for relief have been obtained through this unique service. An interesting report appears in Section V.

HYGIENIC EDUCATION OF EMPLOYEES

Attempts are being made to educate the Company's employees regarding some of the principal facts as to the manner in which diseases are communicated,

and to teach preventive measures. In this connection, an illustrated pamphlet entitled "The Cause of Hookworm Disease, Its Prevention and Cure" has been published in English and Spanish, and has been distributed to all literate employees. A reprint of this paper accompanies the Annual Report, and also pamphlets entitled "Influence of Nutrition on Deformities and Decay of the Teeth," and "Carbon Tetrachlorid Poisoning."

Moving-picture films, prepared by the International Health Board of the Rockefeller Foundation, have been sent to our divisions. These pictures illustrate the manner in which malaria is contracted, and the methods of prevention by the destruction of mosquito larvæ and by the prophylactic use of quinine. This educational service will probably be extended.

WELFARE

The welfare work is assuming large proportions and has a direct bearing on the health and contentment of the employees. The Company has built churches and schools to meet denominational and racial requirements, and has erected and equipped club houses and amusement halls to provide entertainment for the employees. It has also provided baseball grounds, tennis courts, and, in some divisions, where practicable, golf grounds and swimming pools. In this report are shown several photographs illustrating typical phases of the work.

The artificial feeding of infants has always been a great problem in tropical countries. The method devised by the writer and first employed in Panama has proved highly satisfactory. During the past year it has been simplified. A paper entitled "The Use of Sweetened Condensed, Evaporated and Powdered Milks for Feeding Infants in the Tropics," which was read at the World's Dairy Congress (October, 1923), has recently been published by the United States Department of Agriculture in Washington and also by the American Society of Tropical Medicine. A reprint of this paper as published by the latter is enclosed herewith. As customary with the publications of this Society the Summary is in Spanish. Efforts are being made still further to simplify this method by the preparation of a special milk powder, or condensed milk, requiring only the addition of hot water. The simpler any method can be made, the better the results are likely to be, particularly among illiterate people.

INTERNATIONAL CONFERENCE ON HEALTH PROBLEMS IN TROPICAL AMERICA

In order to give an opportunity for the best-informed scientists engaged in the study of tropical health-problems to confer and discuss important questions relating thereto, the Medical Department has invited some of the most distinguished representatives from different countries to confer at Kingston, Jamaica. This Conference will convene on July 23, 1924, and continue in session

to and including July 31. Papers on tropical health problems will be read and freely discussed. The members of the Conference will sail from Kingston on August 1 to visit the Guatemala and Honduras Divisions. Clinics will be held in hospitals in Jamaica, Guatemala and Honduras, and there will be a presentation of cases illustrating the disease conditions that are found in Tropical America. The acceptance of our invitation by many highly distinguished men justifies us in believing that the Conference will achieve results of far-reaching importance, not only to Tropical America, but to the entire tropical world.

MAP

We have inserted a map on page 6 of the present report for the specific purpose of acquainting the readers with the location of our plantations, with particular reference to latitude and longitude.

OPERATING COSTS

We are pleased to record the fact that the cost, \$2.53 per "hospital day" in 1923, is less than in any year since 1914. This indicates commendable effort on the part of our medical staffs in the Tropics, in view of the fact that salaries and wages for all occupations, and the cost of supplies of all kinds, have advanced as much as from 50 to 75 per cent as compared with the years immediately preceding the World War.

It is both interesting and instructive to compare our costs with the operating expenses of hospitals in the North. The following statements in this connection are especially pertinent:

The United Hospital Fund's report for 1912, covering the work of representative hospitals in New York City, showed the average per diem cost to be \$2.55.

The report of representative Chicago hospitals for 1912 showed an average per diem cost of \$2.49.

The average per diem cost of the United Fruit Company's hospitals in 1914 was \$2.53.

The United Hospital Fund's report for 1922 showed the average per diem cost in New York institutions to be \$5.15, excluding depreciation.

The report of Chicago hospitals, covering the first ten months of 1923, shows an average per diem cost of between \$5.00 and \$5.87, excluding depreciation.

The average per diem cost of our hospitals in 1923 was \$2.53, including depreciation.

It will be observed that the per diem costs in New York hospitals during 1922 exceeded those in 1912 by 128 per cent; during the same period the costs in Chicago institutions advanced 136 per cent. Our costs were the same for 1912 and for 1923, if we exclude the Jamaica Division, where we have no hospital, but have an extensive and thoroughly organized dispensary service.

These results appear especially gratifying when we compare our hospital costs with those of outside institutions. Moreover, we must also keep in mind that our morbidity and mortality rates compare favorably with those of northern communities, for this fact indicates that our patients are given proper professional attention and that living conditions are maintained at a high standard. From the standpoint of economy, the benefits derived are obvious. It was shown in our 1922 Annual Report that our non-effective rate over a period of years was less than that which obtains in many northern localities.

In the Tropics the percentage of cost of operating the Medical Department to total operating cost of the Tropical Divisions for the fiscal year was 2.47.

The Medical Department of the United Fruit Company continues to enjoy the full confidence of its employees, as well as of the communities where the Company operates.

We desire to express our cordial appreciation of the continued coöperation rendered by all other departments of the Company.

Respectfully yours,

A handwritten signature in dark ink, appearing to read "W. W. Weeks". The signature is written in a cursive, flowing style with a large initial "W".



Club House and Tennis Court, Truxillo Railroad Division

SECTION II

ORGANIZATION AND COMMENTS ON VITAL STATISTICS

SCOPE OF MEDICAL DEPARTMENT

The Medical Department functions as regards all conditions pertaining to the prevention of disease and the care of the sick and injured. This work embraces the following fields:

- (a) In the Tropics, care of employees and their dependents; and of the inhabitants of communities within the limits of, or contiguous to, the plantations when no other medical service is available.
- (b) On all the Company's steamships, care of passengers and members of the crews.
- (c) In the Domestic Divisions where the Company maintains medical staffs, dispensary service to employees.
- (d) Physical examination of prospective salaried employees; and of all steamship crews before they leave the home port, each voyage.
- (e) Supervision of all matters concerning quarantine and immigration affecting the Company's interests.
- (f) In the Tropical Divisions, supervision and recommendation in all matters pertaining to sanitation.
- (g) Sanitation of the Company's steamships.

For the effective performance of these many and varied duties the Company maintains fully equipped hospitals and dispensaries in the Tropical Divisions, and dispensary service with sanitary staffs, in the ports of New York, Boston and New Orleans.

PERSONNEL OF THE MEDICAL DEPARTMENT

Name	Title	Graduate of
W. E. Deeks, M.A., M.D.	General Manager, New York	McGill University, Montreal, Quebec.
F. B. Mallory, M.D.	Consulting Pathologist, Boston, Mass.	Medical School of Harvard University, Boston, Mass.
R. P. Strong, M.D.	Consultant in Laboratory and Medical Research Work	Medical School of Harvard University, Boston, Mass.
Wm. J. Ginty, M.D.	Sanitary Inspector, New York, N. Y.	College of Physicians and Surgeons, Baltimore, Md.
P. F. Murphy, M.D.	Port Medical Officer, New Orleans, La.	Tulane University, New Orleans, La.
P. H. Desnoes, M.D.	Port Medical Officer, New York, N. Y.	College of Physicians and Surgeons, Columbia University, New York, N. Y.
F. X. Crawford, M.D.	Port Medical Officer, Boston	Medical School of Harvard University, Boston, Mass.
Harry Eno, M.D.	Port Medical Officer, Cristo- bal, C. Z.	Cornell University Medical College, N. Y.
Lois Cutter	Traveling Laboratory Tech- nician	Smith College, Northampton, Mass.

BANES DIVISION

Name	Title	Graduate of
J. R. Ariza, M.D.	Superintendent	Havana University, Havana, Cuba.
A. A. Fuentes, M.D.	Assistant Superintendent	Havana University, Havana, Cuba.
A. F. Ruiz, M.D.	House Physician	Havana University, Havana, Cuba.
R. A. Hernandez, M.D.	District Medical Officer	Indiana University, Indianapolis, Ind.
Ethel Studeville, M.D.	Assistant D.M. Officer	Indiana University, Indianapolis, Ind.
Catharin Cotter, R.N.	Matron	Kings County Hospital, Brooklyn, N. Y.
Amelia F. Buckley, R.N.	Assistant C. Nurse	Roosevelt Hospital Training School, N. Y.
Francisca A. Archer, R.N.	Nurse	Public General Hospital, Kingston, Ja.
Violet R. Perkins, R.N.	Nurse	Public General Hospital, Kingston, Ja.

TOTAL NUMBER OF EMPLOYEES OTHER THAN DOCTORS AND REGISTERED NURSES—43

COLOMBIA DIVISION

Name	Title	Graduate of
E. Urueta, M.D.	Superintendent	Universidad de Bolivar, Cartagena, Colombia.
J. M. Nunez, M.D.	Assistant Superintendent	Universidad de Bolivar, Cartagena, Colombia.
J. A. Fontalvo, M.D.	Assistant Physician	Universidad de Bolivar, Cartagena, Colombia.
D. Gutierrez, M.D.	Assistant Physician	University of Cincinnati, Cincinnati, Ohio.
I. E. Peon, M.D.	Assistant Physician	Tulane University, New Orleans, La.
W. Menk, M.D.	Bacteriologist and Roentgenologist	Hamburg University, Hamburg, Germany.
Hildeyard H. Miller, R.N.	Matron	Auguste Victoria Red Cross Hospital, Berlin, Germany.
Laura G. Aparicio, R.N.	Nurse	Santo Tomas Hospital, Panama City, Panama.
Alicia M. DuBois, R.N.	Nurse	Santo Tomas Hospital, Panama City, Panama.
Carmen M. Roca, R.N.	Nurse	Santo Tomas Hospital, Panama City, Panama.
Imelda de Diamous, R.N.	Nurse	Santo Tomas Hospital, Panama City, Panama.

TOTAL NUMBER OF EMPLOYEES OTHER THAN DOCTORS AND REGISTERED NURSES—40

COSTA RICA DIVISION

Name	Title	Graduate of
A. A. Facio, M.D.	Superintendent	Medico-Chirurgical College, Philadelphia, Pa.
M. D. Rojas, M.D.	Assistant Surgeon	Tulane University of Louisiana, New Orleans, La.
J. M. Jimenez, M.D.	Assistant Surgeon and Roentgenologist	Jefferson Medical College, Philadelphia, Pa.
N. Villalobos, M.D.	Physician	University of Pennsylvania, Philadelphia, Pa.
F. Zumbado, M.D., B.S.C., M.R.C.S., L.R.C.P.	District Medical Officer	Durham University, Durham, England.
R. Marchena, M.D.	District Physician	George Washington University, Washington, D. C.
M. V. Farrell, R.N.	Matron	Jane McAllister Hospital, Waukegan, Ill.
H. A. MacLean, R.N.	Nurse	City Hospital, Worcester, Mass.
S. E. Chaplin, R.N.	Nurse	Public General Hospital, Kingston, Jamaica.
J. W. Shrine, R.N.	Nurse	Public General Hospital, Kingston, Jamaica.

TOTAL NUMBER OF EMPLOYEES OTHER THAN DOCTORS AND REGISTERED NURSES—60

GUATEMALA DIVISION

Name	Title	Graduate of
N. P. Macphail, M.D.	Superintendent	Aberdeen University, Aberdeen, Scotland.
J. W. Ross, M.D.	Surgeon	University of Virginia, Charlottesville, Va.
L. W. McDevitt, M.D.	Physician	Harvard University, Boston, Mass.
H. M. Walker, M.D.	Physician	University of Texas, Galveston, Texas.
R. Aguilar, M.D., D.D.S.	Physician	Universidad, Central de Tegucigalpa, Honduras, C. A., Strycher Dental School, N. Y.
Myra Ellerby, R.N.	Matron	Middlesex Hospital, London, England.
Mary Douglas, R.N.	Nurse	Malden Hospital, Malden, Mass.
Gertrude Jones, R.N.	Nurse	Middlesex Hospital, London, England.
Sarah Rowlandson, R.N.	Nurse	Lady Minto Hospital, Ontario, Canada.
Alice Chadwick, R.N.	Nurse	Prescot Infirmary, Liverpool, England.

TOTAL NUMBER OF EMPLOYEES OTHER THAN DOCTORS AND REGISTERED NURSES—55

JAMAICA DIVISION

Name	Title	Graduate of
I. W. McLean, M.D.	Superintendent	University of Maryland, Baltimore, Md.
J. G. Moseley, M.D., B.S., M.R.C.S., L.R.C.P.	District Physician	University of London, England.
C. A. Moseley, M.D.	District Physician	University College Hospital Medical School, London, England.
F. R. Evans, M.D.	District Physician	Bellevue Hospital Medical College, New York.
A. Cuff-Lushington, L.R.C.S., L.F.P.S.	District Physician	University of Edinburgh and Glasgow.

TOTAL NUMBER OF EMPLOYEES OTHER THAN DOCTORS—18

PANAMA DIVISION

Name	Title	Graduate of
B. M. Phelps, M.D.	Superintendent	Vanderbilt University, Nashville, Tenn.
W. W. Cook, M.D.	Assistant Surgeon	Tufts Medical School, Boston, Mass.
Harry Altman, M.D.	Physician	Tulane University, New Orleans, La.
Theresa J. H. Crumlish, R.N.	Matron	General Hospital, Macclesfield, Cheshire, England.
Christine McKinley, R.N.	Nurse	Brownlow Hill Hospital, Liverpool, England.
M. A. Newlove, R.N.	Nurse	St. John's Hospital, Keighley, Yorkshire, England.

TOTAL NUMBER OF EMPLOYEES OTHER THAN DOCTORS AND REGISTERED NURSES—38

PRESTON DIVISION

Name	Title	Graduate of
E. B. Ross, M.D.	Superintendent	Vanderbilt University, Nashville, Tenn.
M. A. Buch, M.D.	District Medical Officer	University of Maryland, Baltimore, Md.
F. A. Padron, M.D.	Physician	Havana University, Havana, Cuba.
J. de la Guardia, M.D.	Physician	Jefferson Medical College, Philadelphia, Pa.
M. E. Vivar, M.D.	District Medical Officer	Medical College of Virginia, Richmond, Va.
Rose M. McGonagle, R.N.	Matron	New York City Hospital, New York.
Agnes K. Donnegan, R.N.	Nurse	Victoria Hospital, Keighley, Yorkshire, England, and Plaiston Hospital, London, England.
Doris Brandford, R.N.	Nurse	Public General Hospital, Kingston, Jamaica.
Catherine Clarke, R.N.	Nurse	Public General Hospital, Kingston, Jamaica.
Helen Greenlees, R.N.	Nurse	Public General Hospital, Kingston, Jamaica.

TOTAL NUMBER OF EMPLOYEES OTHER THAN DOCTORS AND REGISTERED NURSES—43

TELA RAILROAD COMPANY

Name	Title	Graduate of
R. B. Nutter, M.D.	Superintendent	Tufts Medical School, Boston, Mass.
E. C. Clark, M.D.	Pathologist	University of Pennsylvania, Philadelphia, Pa.
E. J. Whitaker, M.D.	Physician	University of Iowa, Iowa City, Iowa.
W. E. Muldoon, M.D.	Physician	University of Michigan, Ann Arbor, Mich.
B. E. Holton, R.N.	Matron	Turo Infirmary School of Nurses, New Orleans, La.
C. Cavanaugh, R.N.	Nurse	A. R. Stern Hospital, New York, N. Y.
M. Ramirez, R.N.	Laboratory Technician	Woman's Hospital, Nashville, Tenn.
M. Pert, R.N.	Nurse	Kingston General Hospital, Kingston, Jamaica.
G. Booth, R.N.	Nurse	Kingston General Hospital, Kingston, Jamaica.
L. Hippolyte, R.N.	Nurse	Kingston General Hospital, Kingston, Jamaica.
M. Brammer, R.N.	Nurse	Kingston General Hospital, Kingston, Jamaica.
L. Sinclair, R.N.	Nurse	Chicago School of Nursing, Chicago, Ill.

TOTAL NUMBER OF EMPLOYEES OTHER THAN DOCTORS AND REGISTERED NURSES—55

TRUXILLO RAILROAD COMPANY

Name	Title	Graduate of
C. M. Winn, M.D.	Superintendent	Johns Hopkins University, Baltimore, Md.
A. Gage, M.D.	Surgeon	Tulane University of Louisiana, New Orleans, La.
F. E. Hyde, M.D.	Physician	School of Medicine, Western Reserve University, Cleveland, Ohio.
A. E. Moure, M.D.	Physician	Sorbonne Medical School, Paris, France.
W. Bloomer, M.D.	Physician	Birmingham School of Medicine, Birmingham, Ala.
H. L. Bailey, R.N.	Matron	Kings County Hospital, Brooklyn, N. Y.
Hattie Landers, R.N.	Nurse	Williams Private Sanitarium, Macon, Ga.
L. M. Hogg, R.N.	Nurse	Birmingham Infirmary, Birmingham, Ala.
A. Kinnon, R.N.	Nurse	City Hospital, New Castle on Tyne, England.
D. Parker, R.N.	Nurse	Elizabeth Duncan Memorial Hospital, Bessemer, Ala.
Esther Gomez, R.N.	Nurse	Santo Tomas Hospital Training School, Panama City, Panama.
Liboria Rivera, R. N.	Nurse	Santo Tomas Hospital Training School, Panama City, Panama.
Maria Ruiloba, R.N.	Nurse	Santo Tomas Hospital Training School, Panama City, Panama.
Altagracia Barsallo, R.N.	Nurse	Santo Tomas Hospital Training School, Panama City, Panama.
Isabel Calvo, R.N.	Nurse	Santo Tomas Hospital Training School, Panama City, Panama.

TOTAL NUMBER OF EMPLOYEES OTHER THAN DOCTORS AND REGISTERED NURSES—90

COMMENTS ON VITAL STATISTICS AND GENERAL CONDITIONS

The number of patients treated in our hospitals during 1923 exceeded the number treated in 1922 by 6.6 per cent, and was considerably larger than that of any preceding year.

The number of "hospital days" in 1923 exceeded the number in 1922 by 22 per cent. That of the previous years was still lower.

The following figures showing the average daily number of patients in our hospitals plainly indicate the growth of the work since our Medical Department was organized:

1914	1915	1916	1917	1918	1919	1920	1921	1922	1923
452.7	406.0	406.9	421.5	412.4	643.0	681.4	694.4	746.7	910.7

The average number of hospital days per employee annually was higher in 1923 than in preceding years. The rates for the last four years were: 1920, 3.99; 1921, 3.74; 1922, 3.89; 1923, 5.02. The Guatemala, Tela Railroad and Truxillo Railroad divisions showed particularly high rates during 1923; the explanation for this condition is given in Section III of this report.

The hospital admission rates annually per thousand employees were: 1920, 415; 1921, 393; 1922, 379; 1923, 421. The exceptionally high admission rate in 1923 is explained by the abnormal conditions existing in some of our divisions (see Section III), resulting in 998 hospital admissions per thousand employees in the Truxillo Railroad Division, and 747 hospital admissions per thousand employees in the Guatemala Division.

The number of dispensary treatments in 1923 was considerably higher than in any preceding year, with the exception of 1922, but was 2.8 per cent lower than in that year.

The number of dispensary treatments per employee for the last four years was: 1920, 2.59; 1921, 2.69; 1922, 3.40; 1923, 3.48. While the Colombia Division showed an exceptionally high rate per employee, the Guatemala, Tela Railroad and Truxillo Railroad Divisions also showed an average rate of treatment of employees higher than the average rate in all divisions.

The "average non-effective rate per thousand employees" in 1923 was also high. For the last four years the rates were: 1920, 10.98; 1921, 10.26; 1922, 10.64; 1923, 13.74. The divisions showing the highest rates in 1923 were the Guatemala Division, 20.22; Truxillo Railroad Division, 28.69; and Preston Division, 18.39.

The "average partially non-effective rate per thousand employees" for 1923 and for the three previous years were: 1920, 7.10; 1921, 7.37; 1922, 9.31; 1923, 9.53. The divisions showing the highest rates in 1923 were the Colombia Division, 18.24; the Guatemala Division, 15.03; and the Truxillo Division, 15.22.

The "average non-effective rate" indicates the average number of employees in the hospital for treatment out of each thousand employees on the pay-roll; and the "average partially non-effective rate" records the average number of employees calling at a dispensary for treatment out of each thousand employees on the pay-roll. Of course a patient confined to the hospital is totally non-effective, whereas a patient may call at a dispensary for medicine or treatment during part of the day, but spend the rest of the day at his usual duties.

The death rates per thousand employees recorded for the respective years 1914-1923, inclusive, were:

1914	1915	1916	1917	1918	1919	1920	1921	1922	1923
10.59	13.56	10.51	8.06	10.92	14.73	12.17	13.51	12.69	13.01

Since the death rate in 1923 was higher than in 1922, a comparison of the rates in the different divisions for the last year is particularly interesting.

	Banes	Colom- bia	Costa Rica	Guate- mala	Jamai- ca	Pana- ma	Pres- ton	Tela	Trux- illo	Total
1922	10.78	11.52	14.08	16.57	1.42	14.65	16.13	18.54	22.19	12.69
1923	10.92	18.68	14.04	16.98	1.52	12.29	19.86	10.09	23.53	13.01

It will be noted that the death rate reported for the Jamaica Division is abnormally low. This is due to the fact that in this division conditions are the direct reverse of those existing in the other divisions. The United Fruit Company does not maintain a hospital in Jamaica; consequently a laborer who realizes that he is seriously ill will leave the service of the Company and enter a Government hospital. In the other divisions, however, a laborer frequently will remain in his home, receiving treatment by means of home remedies or other unsatisfactory agencies. Such a patient will call upon the Medical Department for attention only when he is in the last stages of disease. In many instances, our physicians are not consulted at all until the patient is practically moribund.

For a proper consideration of the morbidity and mortality rates in our divisions it is necessary to consider the repatriations. We therefore indicate below the repatriation records for the respective years 1914-1923, inclusive:

NUMBER OF PATIENTS REPATRIATED ANNUALLY,
PER THOUSAND EMPLOYEES ON PAY-ROLL

1914	1915	1916	1917	1918	1919	1920	1921	1922	1923
1.30	2.76	1.34	1.48	3.33	1.83	1.49	2.88	2.11	1.99

STUDY OF EMPLOYEE DEATH RATE

A few remarks may prove enlightening regarding the high death rate among employees in some of our divisions. As indicated by the detailed comments given elsewhere in this report, our laborers (comprising approximately 95 per cent of the total number of employees on our pay-rolls) are drawn frequently

from districts not sanitized in any manner, and are consequently heavily infected with many debilitating diseases. Their general health is seriously affected, their resistance lowered to such a degree as to render them readily subject to such diseases as pneumonia and malaria. Furthermore, they are ignorant of even rudimentary principles of hygiene. An analysis of thirty-eight cases resulting fatally, in one of our hospitals, will illustrate this point:

COMPLICATIONS IN THIRTY-EIGHT PNEUMONIA CASES RESULTING FATALLY

Autopsy revealed that 20 cases out of the 38 fatal cases recorded as due primarily to pneumonia were complicated with anchylostomiasis. Ascariasis was present in 8 cases; organic diseases of the heart in 5 cases; 3 suffered also from nephritis; 4 were infested with trichocephalus; 4 were complicated with malaria cachexia. One or more of these complications were present in almost every instance, and frequently several other serious conditions were present as causes contributory to death.

The difficulties experienced by our physicians are indicated by the following facts relating to these 38 cases. Case 1 was admitted 10 days after the onset of illness; Case 2, 11 days after the onset; Case 18 arrived in a moribund condition, and died 7 hours after admittance; Case 20 died 25 hours after admittance; Case 22 was admitted 15 days after the onset of illness, and died 36 hours after entering the hospital; Cases 24 and 29 were both admitted 9 days subsequent to the onset of the disease; Case 30 arrived in a moribund condition, and died within 23 hours; Case 33 arrived 10 days after the onset; Case 34 was admitted in a critical condition 6 days after the initial attack; Case 37 reached the hospital in a moribund condition, and died 24 hours after admittance; and Case 38 died one day after reaching the hospital.

Similar histories are recorded in many other cases resulting fatally, as effectively revealed by a brief comment of one of our superintendents concerning 6 deaths where the principal disease was malaria, and 4 deaths recorded as caused by typhoid fever.

SIX FATAL CASES OF MALARIA

Post-mortem examinations revealed that: Case 1 was complicated with secondary anemia and hookworm; Case 2 was suffering from hookworm; Case 3 was complicated with hookworm and trichocephalus; Case 4 arrived at the hospital in a very serious condition, suffering from a form of pernicious fever, and died 36 hours after admittance; Case 5 had nephritis as a secondary condition; Case 6 arrived at the hospital in a moribund condition, with secondary infections of hookworm and trichocephalus, and died 36 hours after admittance.

FOUR FATAL CASES OF TYPHOID FEVER

Autopsy revealed that: Case 1 also suffered from exophthalmic goitre; Case 2 was cachetic from anchylostomiasis, and infested with strongylus and trichocephalus; Case 3 had anchylostomiasis and was bleeding profusely from the nose; and Case 4 reported a history of repeated attacks from malaria.

These brief statements clearly show that our patients are frequently persons who have been in our service for only a few weeks or months, having come into our divisions from outlying sections where all classes of infectious diseases are endemic. Such cases are anemic, unfamiliar with laws of sanitation or hygiene, and infested with hookworm and similar diseases, complicated with venereal infections. Moreover they are illiterate, and therefore almost incapable of receiving instruction in preventive and precautionary measures. They will not employ preventive medicine; object to living in screened quarters; drink from any available source of water supply; and in various other ways fail to observe measures which might be instituted to cure their ailments and keep them from re-infection. They will not report to the doctor for treatment until a disease has reached an advanced stage, and frequently are not good patients. Furthermore, such employees are more or less migratory in their habits, moving from district to district, thereby making it impossible to institute methods which reduce the morbidity and mortality in a more stable community.

It is enlightening to contrast the death rate among our laborers with the death rate among our salaried employees from temperate zones. Frequently it is assumed by persons not familiar with tropical conditions that the Tropics are seriously detrimental to the health of individuals born in a northern climate. It is our experience that this statement is not true, so far as concerns the American tropical countries in which we operate. We give below a record of the deaths of white employees from temperate zones, covering the year 1923, showing a death rate of only 5.1 per thousand.

Divisions	Number of White Employees from Temperate Zones	Deaths of White Employees from Temperate Zones During 1923	Case Numbers
Banes	341	1	1
Colombia . . .	86	1	2
Costa Rica . .	167	—	—
Guatemala . .	161	—	—
Jamaica . . .	92	—	—
Panama . . .	148	1	3
Preston . . .	409	4	4, 5, 6 and 7
Tela	266	1	8
Truxillo . . .	291	2	9 and 10
Total . . .	1,961	10	

A further analysis of these deaths is given below:

- Case No. 1—laborer, age 58, born in Spain, resided in Cuba 30 years, pulmonary tuberculosis.
- Case No. 2—farm superintendent, age 50, born in France, tropical period of residence not known, traumatism by railway.
- Case No. 3—foreman, age 37, born in England, resided in Tropics 28 months, delirium tremens, chronic alcoholism, morphinism (?), cirrhosis of the liver, acute nephritis, atheroma, ischio-rectal abscess. (Treated only 4 days.)
- Case No. 4—laborer, age 36, born in Spain, resided in Tropics 8 years, acute infection of kidneys.
- Case No. 5—laborer, age 44, born in Spain, resided in Tropics 24 years, hemoglobinuric fever.
- Case No. 6—laborer, age 22, born in Spain, resided in Tropics 4 years, traumatism.
- Case No. 7—laborer, age 33, born in Spain, resided in Tropics 16 years, hemoglobinuric fever.
- Case No. 8—locomotive engineer, age 44, born in the United States, resided in Tropics 18 months, syphilis. (Treated 7 days.)
- Case No. 9—contractor, age 35, born in Spain, resided in Tropics 4 years, bacillary dysentery.
- Case No. 10—machinist, age 60, born in United States, resided in Tropics 2 years, bacillary dysentery.

Of the deaths recorded above, 2 were caused by accident and 2 were directly attributable to personal habits. There were no deaths from anchylostomiasis (hookworm), and, in 8 of our divisions employing more than 1,500 persons from northern climates, there were no deaths from malaria. Among approximately 2,000 employees from northern climates, therefore, there were only 4 deaths from conditions that may be attributed to residence in the Tropics. Moreover, 2 of these 4 deaths were those of laborers, who undoubtedly paid little attention to hygiene and preventive measures, and consequently contracted malaria or hemoglobinuric fever. Both laborers were connected with railroad construction gangs and our Medical Superintendent reports that they recorded histories which indicated old and continued malarial infection without treatment. One case received hospital treatment for 11 days but the other patient died 24 hours after admission. In conclusion it may be stated that only 2 deaths occurred from tropical diseases among the educated, first-class employees from temperate zones, and these occurred in our newest division where a great deal of frontier work is being done, which necessitates living under more or less primitive conditions. Hence, it may be stated that life in a tropical climate in the Western Hemisphere is not detrimental to the health of a white person born in a temperate climate, if such a person will observe the ordinary rules for safeguarding his health.

REPATRIATIONS

In view of the close relationship between repatriations and deaths, a few brief comments regarding our repatriation record during 1923 may be of special

interest. Practically all persons repatriated were among the laboring class, and were employees from Central American countries. The diseases most frequently responsible for repatriation were: Tuberculosis, 25 per cent; chronic nephritis, 11 per cent; and beri-beri, 9 per cent. Approximately half the number of the deportations were due to these three conditions; the rest were caused by a variety of injuries and diseases, none of which were sufficiently prominent to warrant special comment. A good idea of the severity of the illnesses and injuries resulting in repatriation may be gathered from the following brief statements:

BANES DIVISION

During 1923, 5 persons were repatriated; 3 were suffering from syphilis; 1 from pulmonary tuberculosis; and 1 from tumor. They were all Haitians, and had been employed for only a comparatively short time. It was improbable that any of them would survive more than a few months.

COLOMBIA DIVISION

During 1923, 49 persons were repatriated; 23 were not expected to live more than a few months; 18 were suffering only from temporary conditions not likely to influence the term of life; 8 were expected to survive only one or two years.

COSTA RICA DIVISION

During the year there were 22 repatriations; 8 of these persons would probably survive less than a year; 8 were expected to live from 1 to 4 years; and the remaining 6 would probably live for a considerable period of time.

PANAMA DIVISION

During the year there were 18 repatriations; 2 of these persons were suffering from conditions that would probably prove fatal within a year. The other 16 patients were suffering from conditions that were temporary in character, and not likely to affect materially the length of life.

TELA RAILROAD DIVISION

During the year only one person was repatriated. The prognosis was unfavorable, but the probable length of life was undetermined.

TRUXILLO RAILROAD DIVISION

During 1923 there were 13 repatriations. Most of these employees had resided in Honduras only a few months, and their health was probably suffering prior to their entering our employ. The probable length of life ranged from one to five years.

GENERAL

The other divisions did not find it necessary to repatriate any of their employees.

It will be observed that approximately 50 per cent of those repatriated were suffering from diseases or injuries which would not shorten their lives, but which did temporarily incapacitate them for duty during the crop season.

LABORATORY EXAMINATIONS

The laboratory work of our Medical Department is an important branch, in view of the nature of the diseases which we encounter in our divisions. Hence it is interesting to compare the number of blood, stool and urine examinations with the number of patients treated. The following table for the year 1923 is therefore submitted:

Hospital Records	Banes Div.	Colombia Div.	Costa Rica Div.	Guatemala Div.	Jamaica Div.	Panama Div.	Preston Div.	Tela Div.	Truxillo Div.	Total
Total hospital patients .	1,743	3,075	4,249	3,896	51	3,090	1,796	3,387	7,111	28,398
Total blood examinations	1,619	3,009	4,838	3,732	—	3,195	1,816	*6,005	*7,164	*31,378
Total urine examinations	1,689	2,966	3,992	3,697	—	3,192	1,469	*4,187	*7,368	*28,560
Total stool examinations	1,486	2,835	3,704	3,632	—	2,914	1,494	*3,345	*6,477	*25,887
Hospital Dispensary Records										
Total hospital dispensary cases	7,856	12,239	8,700	8,396	4,246	5,580	5,759	*9,850	*16,836	*79,462
Total blood examinations	113	104	282	15	42	1,676	22	*	*	*2,254
Total urine examinations	791	344	469	51	232	191	46	*	*	*2,124
Total stool examinations	413	157	391	9	85	76	15	*	*	*1,146

* NOTE. In the Tela and Truxillo Railroad Divisions the laboratory work of the Hospital Dispensaries is included in the hospital records.

It is highly desirable that all patients be examined thoroughly, as every patient may well be suspected of malarial infection and the presence of hookworms and other intestinal parasites. Treatment for these diseases must be instituted in conjunction with the treatment for the particular ailment which brought the patient to the hospital. In this manner we endeavor to increase the resistance and improve the physical condition of the patient, thereby reducing the liability of re-infection, and also eliminating a potential carrier of infection.

GENERAL REMARKS CONCERNING MORBIDITY AND MORTALITY RATES

Any one interested in tropical conditions will especially appreciate the following general remarks concerning the comparative prevalence of the principal diseases encountered in our Central American and West Indian divisions, considered from a morbidity and mortality standpoint, as shown by death rates, hospital cases and dispensary cases. The accompanying table (Pages 28-31) illustrates these rates in a graphic manner, and includes a record of the mortality per hundred cases.

It is noteworthy that the rates of morbidity and mortality from the various diseases during 1923 approximated very closely the morbidity and mortality rates observed during the period covering the preceding nine years.

Pneumonia was responsible for 22 per cent of the deaths during 1923, and 20 per cent of the deaths during the preceding nine-year period.

Malaria also played an important role in the mortality rate; it was responsible for 13 or 14 per cent of the deaths during each period.

Tuberculosis caused 9 per cent of the deaths in each period.

Dysentery was responsible for more than 7 per cent of the deaths in 1923, and approximately 4 per cent of the deaths during the nine-year period. The exceptionally high rate in 1923 is explained elsewhere in this report. (See Section III.)

Organic diseases of the heart caused 5 per cent of the deaths in each period.

Nephritis caused more than 5 per cent of the deaths in 1923, and more than 7 per cent in the nine-year period.

External causes were responsible for 7 or 8 per cent of the deaths in each period.

It will be observed, by reference to table on pages 28 to 31, that the diseases mentioned in the preceding paragraphs were responsible for approximately 70 per cent of the deaths occurring in our divisions. The other 30 per cent were caused by a variety of diseases, none of which assumed sufficiently large proportions to warrant special comment here.

The table given below shows the principal causes of death in our divisions, and per cent to total, compared to the causes of death in northern communities as recorded by the Metropolitan Life Insurance Company:

Disease	Northern Communities	United Fruit Company's Divisions
Typhoid fever	7	1.0
Influenza and pneumonia	11.5	22.6
Tuberculosis—all forms	12.8	9.0
Cancer—all forms	8.8	1.4
Cerebral hemorrhage-apoplexy	6.8	.8
Diseases of the heart	12.7	5.1
Chronic nephritis	7.0	5.6
Puerperal state	1.7	1.7
Total external causes	11.8	8.2
*All other causes of death	26.2	44.6
	100.0	100.0
*Detail of "All other causes of death":		
Malaria	—	13.4
Diarrhea and enteritis	—	3.0
Other diseases of the digestive system	—	3.2
Diseases of early infancy	—	2.3
Dysentery	—	7.6
Others	—	15.1

TABLE SHOWING COMPARATIVE PREVALENCE OF VARIOUS DISEASES IN TROPICAL

Diseases	Per Cent Causes of Death to Total Deaths	
	1923	Period of 9 years
ENDEMIC OR INFECTIOUS DISEASES:		
Typhoid	1.0129	2.3683
Malaria	13.3517	13.6430
Smallpox	—	.0960
Influenza . . . . .	.4604	2.2550
Dysentery	7.6427	3.9620
Yellow fever	—	.1127
Purulent or septicemic infection	2.3020	1.9010
Tetanus	1.2891	.9180
Tuberculosis	9.0239	9.1329
Venereal infections	2.2099	1.3846
Other endemic or infectious diseases . . . . .	.5525	.6910
GENERAL DISEASES NOT INCLUDED ABOVE:		
Cancer	1.3812	2.0260
Rheumatism . . . . .	.0921	.0320
Pellagra . . . . .	.0184	.2420
Beri-beri . . . . .	.4604	.2410
Rickets	—	—
Pernicious anemia . . . . .	.6446	.8050
Other general diseases . . . . .	.8287	.9489
DISEASES OF THE NERVOUS SYSTEM:		
Meningitis . . . . .	.8287	1.1760
Cerebral hemorrhage-apoplexy . . . . .	.8287	.9830
Other diseases of the nervous system . . . . .	.9208	.6238
Diseases of the organs of vision and adnexa	—	—
Diseases of the organs of hearing and of the mastoid process . . . . .	.0921	.0800
DISEASES OF THE CIRCULATORY SYSTEM:		
Diseases of the heart	5.0645	4.8249
Other diseases of the circulatory system	1.1050	1.3838
DISEASES OF THE RESPIRATORY SYSTEM:		
Bronchitis	—	.2574
Pneumonia	22.0995	20.0900
Other diseases of the respiratory system . . . . .	.7366	.9814
DISEASES OF THE DIGESTIVE SYSTEM:		
Diarrhea and enteritis	3.0387	3.3990
Anchylostomiasis (hookworm) . . . . .	.2762	.4030
Cirrhosis of the liver . . . . .	.7366	.9665
Other diseases of the digestive system	3.2228	3.0923
NON-VENEREAL DISEASES OF THE GENITO-URINARY SYSTEM AND ADNEXA:		
Nephritis	5.6169	7.6530
Other nerve diseases of the genito-urinary system . . . . .	.6446	.7233
THE PUERPERAL STATE	1.6575	.9010
DISEASES OF THE SKIN OR CELLULAR TISSUE:		
Acute abscess . . . . .	.0921	.2090
Ulcer of the skin	—	—
Other diseases of skin or cellular tissue . . . . .	.3683	.7091

AMERICAN COMMUNITIES WHERE THE UNITED FRUIT COMPANY OPERATES

Per Cent Hospital Cases to Total Hospital Cases		Ratio of Deaths to Cases (Per Cent)		Per Cent Dispensary Treatments to Total Dispensary Treatments	
1923	Period of 9 years	1923	Period of 9 years	1923	Period of 9 years
.2929	.3696	11.1	22.0	—	—
38.0379	38.3973	1.1	1.2	22.2317	23.5200
.0145	.3917	—	.85	—	—
2.1191	2.6309	.68	2.9	5.1732	3.3315
3.6450	2.2244	7.9	6.1	.8222	.9942
—	.0066	—	58.3	—	—
.1302	.0846	69.4	77.1	—	—
.0759	.0459	68.0	68.7	—	—
1.3814	1.1526	23.0	27.2	—	—
5.7614	5.8063	1.4	.82	4.9619	4.9515
.9402	.7333	1.2	3.2	1.0426	1.0107
.1663	.1858	30.4	37.3	.1031	.0679
.7881	1.3553	.5	.1	3.8445	3.7304
.0072	.0166	100.0	50.0	—	—
.1229	.0758	14.7	10.9	—	—
—	.0033	—	—	—	—
.4411	.5322	6.6	5.2	1.2901	1.2340
.5930	.4603	4.9	7.1	1.1947	2.1423
.0470	.0581	69.2	69.5	—	—
.0325	.0497	77.8	67.8	—	—
.6256	1.1720	4.6	2.2	2.0595	2.4704
.9872	1.0996	—	—	2.2399	1.7852
.5713	.3817	.63	.73	.7939	.8320
.6003	.4655	27.7	34.6	.3428	.2085
1.1355	1.1282	2.5	4.2	.5761	.6735
1.2222	1.6916	—	.52	5.9323	5.2097
2.2998	1.6028	36.2	43.0	.3634	.2909
.8426	.7578	3.4	4.5	1.8675	1.5150
1.2222	1.0997	4.4	10.6	1.9886	1.6788
5.6267	4.6459	.2	.30	.6199	.6736
.1121	.1233	19.4	26.9	—	—
5.9955	7.0504	1.9	1.5	13.6354	13.0420
1.3814	1.1954	14.7	21.1	—	—
2.7266	2.4393	.8	1.0	2.5299	2.3003
1.7104	.9220	3.2	3.4	.2436	.2274
2.6108	2.5934	.1	.28	2.2734	2.7199
2.2420	2.1219	—	—	3.7336	3.7983
2.5168	3.1078	.4	.78	5.9993	6.2931

TABLE SHOWING COMPARATIVE PREVALENCE OF VARIOUS DISEASES IN TROPICAL

Diseases	Per Cent Causes of Death to Total Deaths	
	1923	Period of 9 years
DISEASES OF THE BONES AND ORGANS OF LOCOMOTION	—	.2740
MALFORMATIONS	—	—
DISEASES OF EARLY INFANCY*†	2.3020	1.6270
OLD AGE . . . . .	.1842	.5960
EXTERNAL CAUSES	8.1952	7.3290
ILL-DEFINED DISEASES . . . . .	.7185	.9581
	100.	100.

AMERICAN COMMUNITIES WHERE THE UNITED FRUIT COMPANY OPERATES—*Continued*

Per Cent Hospital Cases to Total Hospital Cases		Ratio of Deaths to Cases (Per Cent)		Per Cent Dispensary Treatments to Total Dispensary Treatments	
1923	Period of 9 years	1923	Period of 9 years	1923	Period of 9 years
.6581	.6280	—	1.5	.3763	.6129
.0398	.0293	—	—	.0103	.0190
.1338	.3710	16.2	15.1	.1108	.0802
.0506	.0310	14.3	66.1	.0155	.0106
8.7618	9.4203	3.0	2.7	11.0398	11.9089
1.3303	1.3418	1.1	2.1	2.5842	2.6673
<hr/> 100.	<hr/> 100.	<hr/>	<hr/>	<hr/> 100.	<hr/> 100.

The comparative death rates among employees from all causes, for the respective months of the calendar year 1923, were:

	Per 1,000
January	15.43
February	14.37
March	17.94
April	13.95
May	16.26
June	14.91
July	14.04
August	16.28
September	15.53
October	20.89
November	14.94
December	18.09
TOTAL	15.96

MORBIDITY—ANALYSIS OF CAUSES

Malaria was naturally the disease that caused the greatest morbidity in our divisions. It was responsible for 38 per cent of the admissions to our hospitals during 1923, and for the same percentage during the nine-year period. It was also responsible for approximately 23 per cent of the cases treated in our hospital dispensaries during each of the periods mentioned.

Injuries and other external causes comprised 9 per cent of the hospital cases, and 11 to 12 per cent of the dispensary cases during each period.

Hookworm comprised approximately 5 per cent of the hospital cases.

Venereal infections caused almost 6 per cent of the hospital admissions, and 5 per cent of the dispensary treatments.

Influenza constituted more than 2 per cent of the hospital cases, and approximately 4 per cent of the dispensary treatments.

The conditions mentioned above were responsible for more than 60 per cent of the hospital cases. Furthermore, the same diseases were most prevalent among the patients calling at the dispensaries, although bronchitis comprised 5 to 6 per cent of the dispensary cases; and ulcers, acute abscesses and other infections of the skin made up 11 to 12 per cent of the dispensary treatments.

The comparative prevalence of the different types of malaria during the past three years and during the nine-year period extending from 1914 to 1922 inclusive were:

	1921	1922	1923	Average for 9 years	Percentage of Deaths to Cases 9 years
Estivo-autumnal	39.4	27.3	31.1	27.9	1.93
Tertian	25.4	30.2	36.2	27.5	.39
Quartan	1.0	.6	.6	.8	.37
Mixed	3.7	3.6	1.3	3.2	1.18
Clinical	27.7	36.4	28.9	38.4	.76
Cachexia	2.3	1.4	1.2	1.7	5.96
Hemoglobinuric fever . . . . .	.5	.5	.7	.5	26.64

The table given below records the average rainfall and the average number of cases of malaria per 1,000 employees for the respective months, in the different divisions, during 1923, with the total rainfall for the year and the total number of cases of malaria for the year per 1,000 employees:

RAINFALL AND MALARIA RATE

	Bancos Division			Colombia Division			Costa Rica Division			Preston Division			Panama Division			Guatemala Division			Jamaica Division			Tela Railroad			Truxillo Railroad		
	Rain-fall	per M. Emp.	Cases	Rain-fall	per M. Emp.	Cases	Rain-fall	per M. Emp.	Cases	Rain-fall	per M. Emp.	Cases	Rain-fall	per M. Emp.	Cases	Rain-fall	per M. Emp.	Cases	Rain-fall	per M. Emp.	Cases	Rain-fall	per M. Emp.	Cases	Rain-fall	per M. Emp.	Cases
January	2.02	2.9	15.2	9.08	13.3	2.57	5.3	7.77	16.3	12.41	19.0	4.55	6.75	19.7	6.30	64.5											
February	.63	2.7	7.8	7.80	8.3	2.74	3.0	5.45	13.2	3.75	9.9	.51	1.77	14.3	.82	38.1											
March	.98	4.0	9.3	7.63	6.7	.30	3.8	5.82	16.8	2.46	10.7	2.27	.25	12.2	1.41	48.6											
April	1.47	5.2	4.9	5.68	6.9	1.67	5.2	3.67	22.3	1.18	18.3	3.46	.23	13.3	—	37.0											
May	2.21	6.5	.48	9.4	11.30	13.6	7.3	4.99	28.2	1.82	14.3	9.18	1.38	10.1	.71	32.1											
June	.93	20.1	.21	10.2	18.75	14.2	3.83	9.0	14.15	20.7	8.83	15.7	2.63	4.82	7.5	5.82	23.1										
July	1.55	5.8	.48	6.3	15.68	16.9	3.00	5.8	14.50	12.3	14.29	42.4	2.94	4.80	8.6	5.89	43.3										
August	.99	3.9	8.06	7.2	19.80	21.3	1.14	4.2	16.36	19.5	10.06	67.2	12.36	4.98	21.7	4.99	63.2										
September	4.02	.9	2.75	11.2	10.59	14.2	2.0	9.44	15.1	7.30	66.3	4.32	5.63	16.1	3.40	46.4											
October	13.08	1.5	1.10	11.7	9.57	15.3	2.6	3.32	14.4	4.52	59.8	12.36	.83	19.8	8.60	42.2											
November	9.30	2.9	1.27	12.7	22.84	9.2	2.2	16.01	9.8	8.12	31.3	6.09	8.93	10.4	7.40	33.6											
December	1.30	1.6	.10	23.1	25.52	10.2	4.1	20.70	8.3	7.38	27.3	4.25	7.53	10.2	7.20	25.4											
TOTAL	38.48	71.8	14.45	128.9	164.24	151.4	59.7	122.18	198.4	82.12	388.8	64.92	47.00	155.3	52.54	500.0											

FOUR-YEAR RECORD ANALYZED

The accompanying table records the hospital cases and the *total* number of deaths in our divisions during the last four years, with the death rate per 100 cases, death rate per 1,000 employees, and hospital cases per 1,000 employees:

Year	Number of Employees	Number of Cases	Deaths	Deaths per 100 Cases	Deaths per 1,000 Employees	Cases per 1,000 Employees
1920	43,775	20,993	629	3.00	14.37	479.57
1921	46,022	21,874	768	3.51	16.69	475.29
1922	45,223	21,340	734	3.44	16.23	471.88
1923	43,481	22,361	694	3.10	15.96	514.27
Average 4 years.	44,625	21,642	706	3.26	15.82	484.97

It must be understood, of course, that almost all cases of illness or injury among our employees are treated in the hospitals. When a person in a northern locality would merely remain at home and call a physician, an employee in our divisions enters the hospital. Of course these cases, in addition to the more serious cases which would in any event necessitate hospital care, make our admission rate high.

The death rate in 1923, per 100 cases and per 1,000 employees, was lower than in either 1922 or 1921, but higher than in 1920.

The morbidity rate, judging by the number of hospital cases per 1,000 employees, was higher than in the three preceding years. This condition, however, was undoubtedly due to the extensive development of new plantation areas during the year, necessitating temporary quarters and pioneer conditions for a large number of our employees. Naturally these highly undesirable and insanitary conditions are remedied as promptly as possible, and hygienic dwellings, good water supplies and other facilities for maintaining health are provided. Furthermore, the development of new lands requires the recruiting of additional laborers from a distance—frequently men who are entirely ignorant of the first principles of sanitation and hygiene. These two factors account for the increased morbidity during the past year.

It is interesting, however, to observe that the morbidity and mortality rates for the four years do not radically vary.

RELATIVE PREVALENCE OF PRINCIPAL DISEASES

A brief review of the relative prevalence of the most important diseases in our divisions during the past four years may prove instructive:

MALARIA

Year	Hospital Cases per 1,000 Employees	Deaths per 1,000 Employees	Deaths per 1,000 Cases
1920	211.9	1.9	8.7
1921	200.7	2.5	12.7
1922	205.1	1.7	8.3
1923	203.9	1.8	9.0
Average 4 years	205.2	2.1	10.0

The number of hospital cases per 1,000 employees for each of the four years is nearly the same, as there is only a 3 per cent difference between the highest rate in 1920 and the average for the four years. The deaths from malaria per 1,000 employees were almost the same in 1920, 1922 and 1923, but considerably higher in 1921; and the same statement applies to the deaths per 1,000 cases of malaria.

VENEREAL DISEASES

Year	Hospital Cases per 1,000 Employees	Deaths per 1,000 Employees	Deaths per 1,000 Cases
1920	30.2	.23	7.6
1921	28.3	.09	3.1
1922	29.8	.44	14.8
1923	36.7	.55	15.1
Average 4 years	31.2	.34	10.8

These conditions were second in importance to malaria as the cause of entrance to the hospital during these years. The death rate was only .34 per 100,000 employees (or .34 per 1,000 employees); but the average number of hospital cases per 1,000 employees annually was high. It is interesting to note that the rate each year was practically the same.

ANCHYLOSTOMIASIS

Year	Hospital Cases per 1,000 Employees	Deaths per 1,000 Employees	Deaths per 1,000 Cases
1920	15.97	.000	0.0
1921	22.09	.065	2.9
1922	20.74	.022	1.1
1923	35.79	.069	1.9
Average 4 years	23.60	.022	.9

Hookworm ranked next to malaria and venereal conditions as a cause for hospital admissions. The number of cases per thousand employees was higher than in preceding years. The death rate was practically nil, but in many fatal cases this condition was present and undoubtedly rendered the patient less capable of resisting the onset of the other disease, which directly resulted in death.

DYSENTERY

Year	Hospital Cases per 1,000 Employees	Deaths per 1,000 Employees	Deaths per 1,000 Cases
1920	8.2	.64	78
1921	7.1	.54	76
1922	16.0	.91	57
1923	23.2	1.91	82
Average 4 years	13.6	.99	73

The increased prevalence of this disease, and the higher mortality rate, are due to the pioneer work in the Honduras Division, with accompanying unfavorable conditions, as mentioned elsewhere.

CANCER

Year	Hospital Cases per 1,000 Employees	Deaths per 1,000 Employees	Deaths per 1,000 Cases
1920 . . . . .	.48	.18	381
1921 . . . . .	.70	.28	406
1922 . . . . .	.49	.18	363
1923	1.06	.35	326
Average 4 years . . . . .	.67	.25	366

Cancer does not seem to play an important role in our morbidity and mortality statistics, but in view of the world-wide interest in this disease at the present time it is considered desirable to insert this table. Of course, the death rate of approximately 37 per cent of the hospital cases is very high when compared to the death rates from other infections.

INFLUENZA—PNEUMONIA—TUBERCULOSIS

In view of the relationship between these diseases, we are showing in the following consolidated table the statistics relating to them:

	Hospital Cases per 1,000 Employees			Deaths per 1,000 Employees			Deaths per 1,000 Cases		
	Pneu- monia	Tuber- culosis	Influ- enza	Pneu- monia	Tuber- culosis	Influ- enza	Pneu- monia	Tuber- culosis	Influ- enza
1920	9.23	4.57	17.8	4.04	1.64	.18	438	360	10.0
1921	10.91	4.80	17.2	4.56	1.59	.37	418	330	21.0
1922	10.37	5.59	13.0	4.25	1.57	.77	409	281	60.0
1923	14.63	8.79	13.5	5.52	2.25	.12	377	257	9.0
Average 4 years	11.20	5.92	15.3	4.59	1.77	.40	408	299	26.0

Influenza has assumed a prominent place in our morbidity statistics during recent years. The figures relative to this disease were slightly lower in 1923 than in 1920 and 1921, although somewhat higher than in 1922. The death rate from this disease was lower in 1923 than in the preceding years.

The mortality and the morbidity from pneumonia and tuberculosis during 1923 considerably exceeded the rates of previous years. The causes underlying such an unfortunate record are detailed elsewhere in this report. (See Section III.)



Schoolhouse, Tela Railroad Division

SECTION III

COMMENTS ON SOME OF THE CHIEF TROPICAL DISEASES AND
THEIR TREATMENT

MALARIA

The morbidity caused by malaria, together with the consequent economic loss, is so great that it easily outranks in importance that of any other disease in the American Tropics. All reasonable efforts, therefore, should be made to prevent its recurrence, and to ascertain the best possible methods of treatment to effect cures of the infected individuals, in order that they may not act as carriers. The problems involved in the attempt to eradicate malaria from the districts where the Company operates are too gigantic to allow of entertaining even the possibility of their solution in the immediate future. All that we can hope for at present is reasonable control of irremediable conditions. To bring about eradication of malaria certain conditions are absolutely necessary, and it takes time to obtain them. We know the cause of malaria, its methods of transmission and, to a limited extent, the means of cure. Some of the difficulties which confront us in the control of the disease will herewith be briefly referred to.

As is generally known, malaria is caused by a minute animal parasite which is transmitted to man by the *Anopheles* mosquito, in which the parasite itself goes through one stage of its development. The mosquito obtains the infection from a malaria-infected human being. To prevent malaria the cycle of transmission must be broken either by the destruction of the *Anopheles* mosquitoes, preferably in the larval stage, or by the sterilization of the malarial infections in the carriers. As to the first of these propositions: The *Anopheles* mosquitoes are very widely distributed, and multiply in the Tropics at any time of year, wherever even a film of water exists for a few days. Lakes, ponds, rivers, ditches, borrow-pits, water-containers of every variety, and seepage areas are all suitable for their breeding and multiplication. We must also consider that a female lays at one time about 250 eggs, all potential adults, and that only from seven to ten days are necessary to bring them to maturity. In a few days each female adult that survives is prepared to duplicate this number of eggs, so that uncontrolled multiplication of the *Anopheles* soon results in the production of uncounted millions. On the United Fruit Company cultivations, comprising an area of approximately 685 square miles of territory, it would be a bold sanitarian indeed who would attempt the impossible task of destroying all mosquitoes, particularly when adjoining unsanitated areas are continually replenishing the supply.

All that can really be expected, therefore, is the institution of control measures to keep the index as low as possible by reasonable sanitary means.

Regarding the other aspect of the problem, that is, the sterilization of malarial infection in acute cases and in chronic carriers—the only known methods that offer any hope of destroying malarial infection call for the administration of quinine in some form, supplemented by the use of arsenical preparations during indefinite periods. To render this procedure effective the whole community would necessarily have to be treated, not only employees and their families, but all those non-employees who commingle daily with our people. We have no definite knowledge of the amounts of quinine necessary to bring about the desired result, nor do we know the best method of administration, the interval of dosage, or the length of time necessary to carry on treatment. A great many dogmatic assertions have been made as to the above points at issue, but so far these questions are mere matters of opinion which are based for the most part on limited experience, and which lack the stamp of scientific accuracy. We are still groping in the dark to a considerable extent and merely following methods which we believe have given us the best results. In this connection it will be worth while to consider a few abstracts from a recent article, "Studies in the Treatment of Malaria" (*Annals of Tropical Medicine and Parasitology*, October 13, 1923) by that eminent authority, J. W. W. Stephens:

THE TIME AT WHICH RELAPSES OCCUR AFTER CESSATION OF TREATMENT IN SIMPLE TERTIAN MALARIA

The time incidence of relapses can be considered in three ways:

1. In reference to the relapses themselves, i.e., the percentage of the total relapses which occur during each period of time. From an analysis of the time of occurrence of 582 relapses, we found that about four fifths occur in the first twenty days after treatment, that the majority of the remaining one fifth occurs in the second twenty-day period; i.e., the ratio of the number of relapses in the two periods is about 4 : 1.
2. In reference to the total cases treated, i.e., the percentage of cases treated which relapse during each twenty-day period of time. Of the cases treated (800), about three fifths relapse in the first twenty-day period, about one tenth in the second twenty-day period, and still fewer at later periods; i.e., the ratio of the percentages for the two periods is 6 : 1.
3. In reference to remainders, i.e., the incidence among the cases treated, less those who have previously relapsed. Of the cases treated (800), about three fifths relapse in the first twenty days, and about one fourth of "the remainder" cases in the second twenty-day period. The ratios are here 12 : 5, or 2.4 : 1.

From an analysis of 1,000 "rigors" or paroxysms, we found that:

- (a) Over 90 per cent of the paroxysms occur during the hours of bodily activity—in our series of cases, from 7 A.M. to 6.59 P.M.
- (b) The maximum number of paroxysms, about 20 per cent, occurs at 2 P.M.

Quinine sulphate, orally in doses of grains 120 on each of two consecutive days, represents the maximum amount of the drug which can be tolerated by the average case, as the treatment had to be abandoned owing to severe symptoms in five of fifteen cases.

TREATMENT OF AN ATTACK

Quinine

(a) Orally.

Ten grains of quinine sulphate in solution on each of two consecutive days suffice to cut short an attack of simple tertian malaria, and to cause the temporary disappearance of parasites from the cutaneous blood.

While this is so, our routine procedure is to give grains 15 two to three times a day for a few days until the same result is accomplished. The subsequent treatment will be considered later.

(b) Intramuscularly.

1. Quinine bihydrochloride.

Fifteen grains of quinine bihydrochloride in 2 c.c. of water, on each of two consecutive days, likewise cause the cessation of febrile paroxysms and effect the temporary disappearance of all stages of the parasites from the cutaneous blood. This holds good for *P. vivax* and *P. falciparum*.

Where the patient can take quinine by the mouth there is usually no necessity for intramuscular injections, but where oral quinine is ineffective, intramuscular quinine remains as a most effective treatment.

(c) Intravenously.

Quinine bihydrochloride in doses of 10–15 grains in a 10 per cent solution in normal saline, in one or a series of six injections, causes the cessation of febrile paroxysms and a disappearance of parasites from the cutaneous blood in simple tertian malaria.

In malignant tertian malaria these doses do not cause the disappearance of parasites—trophozoites or gametes—from the cutaneous blood.

Arsenic(a) Organic. *Arsenobillon*. (Chemically related to arsphenamine.)

A single intravenous injection of 0.9 gramme controls the fever and causes the disappearance of *P. vivax* from the cutaneous blood within twenty-four hours. The same dose has no appreciable effect on the temperature or the parasites in the case of *P. falciparum* or *P. malariae*.

(b) Inorganic. *Liquor arsenicalis*.

In doses of m 15 daily, failed to control the fever or to cause the disappearance of parasites. In doses of m 30 daily, the temperature fell to normal within ten days, and in 13 of 14 cases parasites disappeared in two to six days.

Luargol (A silver arsenical preparation).

A single intravenous injection of 0.2 gramme controls the symptoms and causes the disappearance of the parasites in simple tertian malaria.

Treatment by preparations of antimony, manganese, quitenine and quinotoxin, amylopsin and trypsin gave no results.

SUBSEQUENT TREATMENT

We have seen that the immediate effect of quinine and other drugs is to allay the febrile symptoms and to cause the disappearance of parasites, but this condition of apparent cure was, sooner or later, followed by a relapse in the majority of cases. Two questions consequently arose:

1. The first was, could the condition of apparent cure be maintained by continuing the quinine treatment, and if so, how should it be given?
2. The second was, were these cases in which the administration of quinine was continued for more or less long periods, and which showed no symptoms while taking quinine, really cured? Would they relapse or not, when treatment was stopped, just as they had done when the treatment had lasted only a few days, or would the number of relapses be now smaller?

QUESTION 1

The aspect of the problem that mainly occupied us was, whether if a certain total dose of quinine were given weekly, e.g., grains 30, 60, 90, it were better to administer the quantity on six days, giving 5, 10 or 15 grains daily, or on two consecutive days, only, each week, giving 15, 30, or 45 grains daily.

This question was put to the test for a period of eight weeks in a series of cases for each total weekly dose of 30, 60 and 90 grains of quinine sulphate.

An accurate record was kept of the febrile relapses (non-parasitic) and of the parasitic relapses (febrile and afebrile), as determined by the temperature chart and daily blood examinations during the whole of the period.

In each series the record was in favor of the weekly administration of quinine in preference to the daily.

Thus, 30 grains is better administered in the form of two doses of 15 grains, than in the form of six doses of 5 grains.

The best result was obtained by the administration of grains 45 (three doses of grains 15) on each of two consecutive days weekly, this, as above stated, giving a better result than grains 15 daily for six days.

In other words, in order to maintain a patient in a condition of freedom from relapses, an interrupted course of quinine is preferable to a continuous one.

So far as the actual result was concerned, an equally good one, or nearly so, was obtained in a different way, viz., by giving 15 grains of bihydrochloride intramuscularly on each of the first two days of treatment, and then *Liquor arsenicalis*, minims 30 daily, with two periods of intermission for eight weeks (two weeks on, one week off, two weeks on, one week off, two weeks on).

QUESTION 2

This question resolves itself into an inquiry as to whether by any course of treatment, short or long, a curative effect would be obtained, i.e., freedom from relapses after cessation of treatment, over an observation period of sixty days (or longer).

Many methods were tried, but in nearly all, when treatment was stopped, the number of relapses was large, and there is at present no method known which will cure all cases, even if the treatment lasts eight weeks.

Many methods of cure continue, however, to be advocated, but they are not supported by trustworthy evidence, more especially in regard to an adequate observation period.

The following two treatments gave us the best results:

Liquor arsenicalis, minims 30 daily, with one or two periods of intermission with an injection of quinine bihydrochloride on each of the first two days only.

Novarsenobillon 0.9 grm. intravenously on the first, eighth, and fifteenth days with quinine bihydrochloride grs. 15 intramuscularly on the first and second, eighth and ninth, and sixteenth days.

It is worthy of note that a treatment which is "good" while it lasts is not necessarily followed by a "good" result when it has ceased. Thus the treatment noted above, viz., grains 45 x 2 weekly for eight weeks, while "excellent" while it lasted, was followed by 80 per cent of relapses when the treatment had been finished.

Whereas the arsenic treatment, also a good one while it lasted, was followed by a "good" result also when it had ceased.

QUESTIONNAIRE SENT TO OUR PHYSICIANS

With the object of obtaining the expert opinions of our physicians who have had extensive experience in the treatment of malaria in tropical countries, we

sent them the following questionnaire requesting information on certain important points:

(First) Is the administration of quinine in liquid form preferable to its administration in capsules, disintegrating tablets or friable pills?

We know that quinine is insoluble except in an acid medium, and that in cases of fever the acid secretions of the stomach are lessened. It has always been my impression that during the febrile stage we obtain better absorption from quinine in liquid form than we do when utilizing it in a solid form, but that during the afebrile stage there are sufficient acid secretions in the stomach to dissolve it in solid form. However, Grosser has stated that even the insoluble preparations are completely absorbed. If this be true during the febrile stage, there is no need of our giving quinine in solution, and we shall thus do away with one of its objectionable features.

(Second) What dosage is desirable?

Some authorities claim that in all the benign forms of fever 30 grains daily are sufficient during the febrile period; and that 10 grains daily thereafter, if the dose is continued over a period of two months, will absolutely cure the patient. From my experience in the Canal Zone I gained the impression that the administration of 45 grains during the febrile stage, and for three days subsequent thereto, and 30 grains daily for a period of two to three weeks thereafter, gave us quicker results and prevented relapses, and this method was adopted. However, we believe this is another point warranting investigation, as we do not wish to give more quinine than is required to bring about the desired results.

(Third) Should the quinine be administered two, or three, times daily? If twice daily is sufficient to give the required dose, it will mean economy in work for our hospital staff.

If you are not in a position, from your experience, to give us positive answers to the above questions, it is requested that you take a series of cases of positive malaria, keep a careful record of their names, ages, complications, history of previous attacks and the present attack, etc., and that you satisfy yourself thoroughly as to:

1. Whether or not the administration of quinine in liquid form is preferable to its administration in capsules, disintegrating tablets or friable pills.

2. What dosage is desirable. (With a follow-up history over a couple of months as to whether or not the patients have a relapse.)

3. Whether the quinine should be administered two, or three, times daily.

A great many dogmatic statements have been made in answer to the above questions, and positive evidence is desired as to the best method of procedure. You have on your staff trained and experienced men who possess scientific instincts and are sufficiently observant to give us these data.

There are two ways in which malaria can be eradicated: One is through the destruction of the mosquito—the transmitting agent; and the other, by means of community prophylaxis by quinine.

In regard to the first method (mosquito-destruction), we believe the United Fruit Company is doing all that can be expected of any commercial organization in the way of maintenance of sanitary measures, and the results have shown consistent improvement. The question arises, therefore, whether or not some effort should be made to sterilize the malarial carriers that are responsible for the transmission of the disease.

Undoubtedly a great many of the men employed by the United Fruit Company, and their dependents, are carriers. To determine which are, and which are not, would necessitate a careful blood examination of the whole population, preferably by the "thick film" method. This would be a gigantic task, and one

which we could not recommend, with our present organization. The only way, therefore, to cure the carriers would be by prophylactic treatment of the entire community, extending over a period of eight weeks or more. Naturally there might be some members of our organization who would not care to submit to this treatment. Salaried employees who might protest (a small minority) could have their blood examined, and if it were free from organisms they would naturally be exempt from treatment. But if good results are to be obtained, every carrier should be obliged to submit to treatment or be expelled from the community.

There are different methods of giving quinine for prophylactic and sterilization purposes. One is to give 10 grains daily over a period of eight weeks; another to give 30 grains daily every Saturday and Sunday over a period of eight weeks; and a third method is to give 15 grains twice a week over a period of eight weeks. Some believe 15 grains once a week sufficient for prophylactic purposes. We have had experience in some of the divisions in giving quinine by some of these methods, and apparently with excellent results.

Community prophylaxis has been attempted on a large scale by the Rockefeller Foundation in this country; by the Italians; and also by the English in Ismailia. They have all reported a reduction in the amount of malaria, from 80 to 85 per cent. If we could carry on a similar prophylactic campaign among our employees and have similar results in the reduction of the number of cases of malaria, the financial advantage to the United Fruit Company would amount to a very large sum. An attempt of this kind would therefore seem justifiable.

To be successful we should necessarily require the coöperation of all departments, from the Manager down to the ultimate division, and a special corps of responsible, trained male nurses to assist. All communities over which the Medical Department at present exercises supervision in your division would have to be simultaneously treated over a period of two months, and for this purpose it would probably be better to select the dry season.

The replies to this questionnaire may be briefly summarized:

The consensus of opinion regarding the first question is that liquid quinine is preferable in the febrile stage of the disease, is more readily absorbed and more effective; but that in the case of afebrile conditions, friable pills or tablets are equally satisfactory. Two qualifications of this statement, however, are necessary. First, a small percentage of persons are nauseated by the liquid preparation; and second, a small percentage cannot swallow pills or tablets. Under these conditions a certain degree of latitude must be allowed for the idiosyncrasies of the patients. Furthermore, a great many tablets and pills that are on the market are insoluble and therefore unabsorbed; hence they entirely lack therapeutic power.

In reply to the second and third questions, in regard to the dosage, opinion is equally divided. Some believe that 15 grains three times daily should be given for the first five or six days; that the dose should then be reduced to 10 grains three times daily for four or five days; and that there should be a follow-up treatment of two 15-grain doses every Saturday and Sunday for eight weeks. Others believe that they get equally good results by the administration of 20 grains in the morning, and the same number at noon; the stomach is more irritable in the evening. This treatment should be continued for five or six days, and then the dosage can be reduced to 15 grains twice daily for four or five days, with the

same follow-up system as that referred to above. All believe the follow-up treatment is very valuable, but not always practical. Again, the consensus of opinion is that in our plantation work a dose of 10 grains daily for eight weeks is neither practicable nor effective. The writer believes that equally good or even better curative results can be obtained through a follow-up treatment with Aiken's tonic tablets, which have the following formula: (Two of these should be given after each meal.)

Quinine sulphate	1 gr.
Acid arsenous	1/50 gr.
Strychnine sulphate.	1/50 gr.
Reduced iron	2/3 gr.
Ext. gentian.	1/ 4 gr.

In regard to community prophylaxis, this is not to be recommended at present for various reasons:

First: It is impossible to obtain the coöperation of the whole population; obviously, it would be useless to protect only a part of the population, and to allow untreated active carriers to circulate freely throughout the community.

Second: An attempt of this kind should be preceded by a campaign of education, and to carry out such a plan among an illiterate population is a difficult proposition.

Third: It would be necessary to obtain governmental support and compulsory measures for the carrying out of any program for general cinchonization.

Fourth: Probably the greatest difficulty encountered in our work among employees is attributable to the fact that a large percentage of the labor, particularly in new land-cultivations, is migratory. The Superintendent of Agriculture in one of the divisions estimates that a laborer's length of stay in that division averages less than two months. In other words, the average period a worker remains in our employ is no longer than the time required to sterilize his blood of malarial infection, and his place is then taken by another infected laborer. A preventive campaign under such conditions would be interminable.

IMPORTANCE OF BODY'S CURATIVE AGENTS—MALARIA

In this connection, another point should be considered. The writer believes that it is impossible by any known means to cure malaria absolutely in an individual who is suffering from some other complicating or debilitating condition, such as syphilis, hookworm disease, or malnutrition. In other words, in any attempt to eradicate the malarial infection in an individual, the administration of quinine is ineffectual without the assistance of the natural curative agents of the body. If a cure is to be effected, complicating conditions must be concurrently treated, vital resistance increased, and Nature assisted in every way. Statements repeatedly appear in various publications to the effect that the arsenical prepara-

tions are curative for malaria. The writer believes that the favorable results reported are due not to any direct destructive action on the malarial parasites, but either to the specific results of these preparations in complicating syphilis, or to the general tonic effects of arsenic in increasing the natural resistance and thus assisting the curative and protective agencies of the body. We venture to hope that some preparation of quinine or other plasmodial parasiticide will be devised, similar to those arsenical preparations which have been developed for the treatment of syphilis, in order that prompt destruction of the parasites may be effected without injury to the human organism.

Our Medical Superintendent in Costa Rica observes that in most cases of malaria there is a tendency for patients to suffer from acidosis. He states that he has been administering some alkaline drug, such as bicarbonate of soda, before meals and giving the quinine solution after meals. He has been employing with excellent results the method described in the following abstract from the *Indian Gazette*, of Calcutta:

QUININE MAGNESIUM SULPHATE TREATMENT OF MALARIA

On the basis that the malaria paroxysm is of the nature of an "anaphylactoid" phenomenon, Sinton developed what might be termed a combined quinin-alkali treatment, thus assisting the natural defenses of the body to combat any tendency to "acidosis" or diminished alkali reserve; making the reaction of the body fluid more favorable to the optimum parasitocidal action of the quinin; and at the same time helping to alleviate the symptoms of cinchonism. The alkaline mixture, per dose, consists of sodium bicarbonate, 60 grains, and sodium citrate, 40 grains, in 1 ounce of water. The quinin mixture consists of quinin sulphate, 10 grains; citric acid, 30 grains; magnesium sulphate, 60 grains, in 1 ounce of water. One dose of each mixture, from fifteen to thirty minutes apart, is given three times daily for four or five days, and twice on each of two successive days; 180 grains of quinin are given in the course of seven days. Very favorable reports are made regarding the use of this treatment.

MALARIA AND SANITATION

Dr. Barber's recent malaria survey on the plantations of Honduras and Guatemala plainly indicates that the *Anopheles* index is comparatively low there. This fact is clear evidence of satisfactory sanitary work. On the other hand, the malarial index is high—probably over 30 per cent of the people are infected—and this condition is confirmed by Dr. Clark's survey. The conclusion, then, undoubtedly is that if the incidence of malaria is to be reduced, measures must be initiated to limit the number of carriers, through some method of quinine administration over a long period. While under the influence of quinine, few parasites appear in the peripheral blood, and Darling has shown that no mosquito infection can take place unless there are at least 12 gametes, or sexual parasites, to the cubic millimeter of blood. The routine administration of quinine should

materially lower the incidence of malaria, particularly during the wet seasons, which are favorable for the multiplication of *Anopheles* and hence for the transmission of malaria. It is our belief that periodical administration of quinine, over a period of two months, to all individuals, in all stable communities, and to all members of our labor camps—particularly when there is an influx of new labor—would result in a great diminution of the incidence of malaria, especially if the present sanitary conditions be maintained.

DEVELOPMENT ACTIVITIES OF THE COMPANY IN RELATION TO MALARIA

In view of these facts, a review of the work of the Medical Department for the year 1923 necessitates a consideration of the development activities of the United Fruit Company, as these have a definite bearing on the morbidity and mortality statistics of the malarial incidence:

During the past year the Company planted 40,878 acres of virgin land, or approximately 64 square miles. It is particularly this class of frontier work that is responsible for a large increase in morbidity. The primitive jungles must be cut down, extensive drainage work undertaken, camp sites located and built upon. Such a program requires a great many laborers working under conditions where necessarily no preventive measures can be undertaken except by quinine prophylaxis. That, moreover, frequently constitutes a difficult problem, owing to the natural antipathy of the uneducated laborers in regard to taking quinine, and their inability to comprehend regulations essential to their own protection. Owing to the labor turnover incidental to the new-land cultivations, it is necessary to import new labor. This must be recruited from outside sources, usually from districts where sanitary measures are merely primitive and the rate of malaria and of hookworm disease is high. Moreover, many of the laborers are afflicted with tropical leg-ulcer and, in addition, not a few of them suffer from malnutrition and other debilitating conditions on entering the Company's employ. There is naturally, therefore, a lowered resistance to disease, and with these conditions unavoidably existing in connection with the preparation of new land for cultivations, the morbidity and mortality rates are high. Approximately 90 to 95 per cent of our employees in the tropical divisions are laborers whose numbers include negroes, native Indians and mixtures of different races absolutely unfamiliar with even the rudiments of sanitary regulations. In the older cultivations, where labor is more stable, conditions are much better and our morbidity is less, as the laborers have been gradually taught and trained to take care of themselves. If it were possible to obtain that coöperation which can rightly be expected in an educated community, and if each householder could be held responsible for the sanitary conditions in the immediate vicinity of his dwelling, the problem of disease-prevention would be greatly simplified.

When a ditch is allowed to fill up with rubbish, and drainage is thus interfered with, large numbers of mosquitoes will be bred within a few days. Cans, bottles and other containers carelessly thrown about become filled with water in rainy seasons, and immediately they are potential breeding places.

It is useless to screen the houses of any but the better educated. The screens will not be kept in condition, and a house with defective screening is worse than one without screens, for mosquitoes not only gain entrance, but remain in. Constant vigilance is necessary, therefore, for the maintenance of even a semblance of sanitary efficiency. In fact, a regular system of constant sanitary supervision is essential to success. The general supervision and direction of the Company's development work is in charge of intelligent natives or whites, mainly from temperate zones. The importance of education and enlightenment of the population in sanitary problems, with a view to the prevention of disease, is clearly comprehensible when the malarial rate among the illiterate is contrasted with that which obtains among the educated population. Granted an intelligent population with a knowledge of the manner in which malaria is communicated and the ability and willingness to apply this knowledge—if the sanitary conditions are reasonably good, there is no reason why malaria should be a serious menace to the health of a community.

PULMONARY DISEASES

The morbidity and mortality incidental to pulmonary diseases are probably the most serious of all conditions affecting our work in the Tropics. The negro, native and mixed races seem to lack immunity to these diseases, which are characteristic of the white races. When tuberculosis is contracted it rarely remains limited to a single organ, but almost always eventually becomes disseminated throughout the system.

Pneumonia also is generally complicated, and the mortality rate exceedingly high. Undoubtedly influenza is frequently a predisposing, if not an exciting, factor in the causation of pneumonia. A few abstracts from the reports of our medical superintendents, together with the post-mortem findings on a few cases, will explain this high death rate.

TRUXILLO RAILROAD DIVISION

During the year there occurred in the hospitals of this division 97 cases of lobar pneumonia, accounting for 50 deaths, or 25 per cent of the total number of deaths from all causes. This represents a terrifically high mortality. Again we are confronted with a grave problem in dealing with this infection. It has been the writer's experience that lobar pneumonia, once it attacks a native of Latin America, must be considered as very different from what it is in more northern

latitudes among a heartier and a stronger race. It is the exception rather than the rule for the temperature to fall by crisis in the disease. In connection with this subject, it is enlightening to note several fundamental factors which contribute to a high mortality rate among the laboring population:

- (1) An exaggerated carelessness, amounting to utter disregard, of personal hygiene. Laborers sleep in the same clothing that they wear during the day, often wet with perspiration or rain; and they seldom bathe.
- (2) Many of them are heavy rum-drinkers and have damaged kidneys. Frequently a laborer enters the hospital with an attack of pneumonia that has immediately followed a rum debauch lasting a number of days.
- (3) Many of the people suffer from acquired or congenital syphilis.
- (4) The majority of them are victims of from a moderate to a marked degree of secondary anemia, originally caused by either malaria or hookworm disease.

Given a case of lobar pneumonia in a patient who has been or is suffering from one or all of these conditions in varying degrees, the prognosis is grave no matter what your treatment may be. The majority of these cases show a rather marked degree of myocardial degeneration. This condition I believe to be due largely to anemia, nephritis or syphilis.

PRESTON

The high death rate from pneumonia is due principally to two causes: (1) Undernourishment among some, particularly the Haytians, arriving in Cuba; and (2) the serious condition of the patients when they are brought to the hospital; a great many are practically moribund when admitted.

GUATEMALA

During the year 81 cases of pneumonia, 57 of lobar pneumonia and 24 of broncho-pneumonia, were treated in the Hospital. Of this number 26 cases died, a mortality of about 32 per cent. This high mortality seems to have been due to many causes,—principally, the advanced state of the disease, in many instances, before the patient sought admission; and the weakness attributable to undernourishment among so many of our people who do not appreciate the value of a properly balanced diet. As is commonly known, most of them are hard drinkers and their resistance is extremely low, so that their response to treatment and careful nursing is often very disappointing.

COLOMBIA

It will be noted that there was a high mortality rate from pneumonia during the past year, following an epidemic of influenza among the peons. These people

are chronically undernourished and wholly ignorant of the importance of maintaining those conditions essential to their health and vitality. They consume a great deal of white rum in the "pueblos," where they congregate during their hours of leisure. As they over-indulge, their resistance is weakened and deaths from pneumonia and other diseases frequently result.

TELA

Pneumonia, as it has been heretofore, is the chief cause of mortality. I take occasion in this Annual Report to call attention to the fact that our new land work is done mostly by hill natives, who are unaccustomed to the coast climate, and who are consequently very susceptible to diseases of the respiratory tract. In this class of patients, as our autopsy records show, there is a pronounced tendency to complicating conditions such as pneumonia, pyemia, joint infections and meningitis. Furthermore, the hospital records of these fatal pneumonias do not represent the work of the Medical Department—for these men, being contractors, remain at work during the first few days of the disease, then stay in their shacks a day or so, and not until the crisis approaches do they go to the Hospital. They arrive there practically moribund. An analysis of the fatal pneumonias shows that most of these patients have a hospital record of less than three days.

POST-MORTEM FINDINGS OF SOME CASES OF PNEUMONIA IN THE PANAMA DIVISION

D. A., male; aged 16; Panamanian; admitted on a stretcher. History of previous illness of three months; apparently patient was a congenital idiot; died on 22nd day after admission. Post-mortem showed emaciation and old contractures of both knees; middle and lower lobe of right lung and lower left lobe consolidated in stage of red hepatization; liver enlarged, and with 10 to 15 infarcts; spleen 3 times normal size; kidneys with acute glomerular nephritis; skull abnormally thick, especially over frontal lobes; brain, anterior to fissure of Rolando, small and poorly developed, first and second ventricles enlarged, and with persistent thymus weighing 10 gms.

U. W., male; aged 46; Jamaican; sick 4 days; died on 5th day after admission. Post-mortem showed consolidation of right lung in gray hepatization; spleen $1\frac{1}{2}$ times normal size.

J. H., female; aged 39; Jamaican; sick 15 days; died 3d day after admission; emaciated, with spleen very large, blood positive for malaria and with 65 per cent hemoglobin. Post-mortem showed multiple petechiæ of pericardium; consolidation and congestion of dependent half of lower left lobe; focal necrosis of right lobe of liver; spleen twice normal size. (Apparently death not due to pneumonia alone.)

M. G., female; aged 45; Panamanian; sick 2 weeks; died on 7th day after admission; emaciated, blood positive for malaria. Post-mortem showed 4 ounces of fluid in pericardial sac; myocarditis; left lower lobe in stage of gray hepatization; accessory spleen; liver enormously enlarged, with one hemorrhagic infarct and many small necrotic areas.

A. R., male; aged 49; Colombian; sick 2 weeks; died on 3d day after admission; blood positive for malaria. Post-mortem showed atheroma throughout thoracic aorta; dense pleural adhesions over base of left lung, with consolidation of lower lobe; liver enlarged, and with areas of focal necrosis; spleen en-

larged and adherent to surrounding structures; kidneys showed subcapsular hemorrhages.

E. W., female; aged 52; Jamaican; sick one week; died 4th day after admission. Post-mortem showed right lung edematous, and filled with viscid purulent material (probably resolving pneumonia); left upper lobe consolidated (gray hepatization); and lower lobe filled with rusty purulent material.

E. G., male; aged 32; Jamaican; sick 5 days; died 6th day after admission. Post-mortem showed consolidation of all of right lung and upper lobe of left. Liver enlarged and firmly adherent to diaphragm; spleen greatly enlarged and adherent to surrounding structures.

C. P., male; aged 55; Nicaraguan; sick 16 days; died on 5th day after admission; blood positive for malaria; patient had hookworm, albumin and casts. Post-mortem showed 2 ounces of fluid in pericardial sac; heart enlarged; myocarditis; entire right lung consolidated (gray hepatization); anterior half of middle lobe gangrenous; liver greatly enlarged, and fibrotic; spleen three times normal size; kidneys greatly enlarged. (Cause of death was "gangrene of lung.")

F. A., male; aged 42; Nicaraguan; sick 15 days; died on 2d day after admission; blood positive for malaria. Post-mortem showed 4 ounces of fluid in pericardial sac; entire pericardium covered with fibrinous exudate; left pleural cavity contained 6 ounces of exudate; left lower lobe consolidated (red hepatization); congestion of right, lower and middle lobes, with dense adhesions at the apex; liver enlarged, with focal necrosis throughout; small unidentified tumor on lower border of right lobe.

H. M., male; aged 35; Colombian; sick 8 days; died 9th day after admission; blood positive for malaria; uncinariasis and ascariasis present. Post-mortem showed advanced myocarditis; lower lobe of right lung consolidated (gray hepatization); cavity 3 inches in diameter in upper lobe, walled off by adhesions; peribronchial glands hyperplastic; liver enlarged, with entral necrosis throughout; spleen twice normal size; scars and multiple small cysts in kidneys; sputum negative for T. B.

J. B., male; aged 29; Jamaican; sick 3 days; died 8th day after admission; blood positive for malaria; casts in urine; hookworm infection. Post-mortem showed heart greatly enlarged, and with myocarditis; aortic stenosis; left lung and right upper lobe consolidated (gray hepatization); liver greatly enlarged; kidneys cystic.

S. R., male; aged 64; Jamaican; sick 2 weeks; died 8th day after admission; (temperature never above normal); blood positive for malaria. Post-mortem showed right hydrothorax (1000 c.c.) pericardial sac contained 8 ounces of fluid. Heart was typical *cor bovinum*, aorta atheromatous, with right upper lobe consolidated (red and gray hepatization) and edema of other lobes; kidneys sclerotic and atrophic; small subcapsular abscess of right kidney.

DYSENTERY

BOWEL DISEASES

Dysentery is frequently encountered in tropical and sub-tropical countries, in sporadic or epidemic form. Its clinical manifestations are the frequent occurrence of stools, associated with more or less griping or colicky pains, and tenesmus or straining at stool. The dejecta contain blood, mucus and, at times, pus. The general character of the disease varies according to the organisms causing it. Several distinct classes of parasites are responsible for most of the dysenteries encountered. Each class gives rise to characteristic lesions and clinical symptoms,

and necessitates different methods of treatment. Most of the cases are caused by the bacillary group, or by *Entameba histolytica*.

BACILLARY DYSENTERY

This clinical type is caused by the *Bacillus dysenteriae*, of which several strains are known. The Shiga strain causes the severest symptoms, and is responsible for most of the deaths attributable to this kind of dysentery. Other strains of the same organism may cause severe dysentery, but rarely cause fatalities unless there are complications due to other debilitating conditions.

Bacillary dysentery may occur either sporadically or in epidemic form; in the latter case it is usually associated with unhygienic living conditions. Chronic carriers of the disease are the sources of contamination through their dejecta.

Infection can be conveyed by food and drinking water, and possibly by dust inhaled. Contamination of food and drinking water is usually caused by house flies, which either convey the organisms mechanically, on the body, or infect indirectly through their vomit or feces. The organism is not destroyed in the digestive tract of the domestic fly. It is possible that other insects also act as transmitting agents.

The incubation period is usually short—from two to three days—and the lesions are confined almost altogether to the large intestine and the rectum. The lower part of the small intestine is only occasionally involved. The mucous membrane may only be acutely inflamed, but in severe cases actual necrosis and superficial ulceration take place. The symptoms may be either mild or severe, but in any event headache, nausea, vomiting and fever are usually present. There is acute tenderness on palpation over the abdomen. Gripping or colicky pains, with tenesmus or straining at stool, are prominent symptoms, together with the passage of many stools, consisting in the early stages mainly of mucus and blood, and practically lacking fecal odor. Toxemia followed by prostration, more or less severe according to the gravity of the case, is characteristic and may cause the death of the patient within a few days. In the mild and moderately severe cases convalescence should take place within from one to two weeks, but occasionally the disease assumes a chronic form and necessitates treatment over a considerably longer period.

TREATMENT

Patients should be strictly confined to bed, as absolute rest is essential, and a liquid diet should be prescribed. This should consist chiefly of milk, albumin water, meat broths, barley or rice water, corn starch, and jellies or puddings made of sago. If the gripping pains and tenesmus are very severe a hypodermic of morphine with atropine should be employed, but its repeated use must be carefully

restricted. The administration of one dram of sodium sulphate or 2 drams of magnesium sulphate, or a mixture of both, in 2 ounces of water should be given and repeated every two hours the first day, or until the fecal odor is discernible in the stools. Subsequently these salines should be administered less frequently and in smaller doses, according to the status of the case. In most acute cases no other medication than what has been described is necessary. In severe toxic cases, however, a normal or hypertonic saline solution should be given intravenously or hypodermically to tide the patient over a crisis. In cases involving severe tenesmus, relief can be obtained by a warm normal saline enema, if the patient can tolerate it. In chronic forms the use three or four times daily of bismuth subnitrate in heaping teaspoonful doses, stirred in a tumbler of water, should be tried along with general tonic and supportive treatment.

During the past year we treated in our hospitals 410 cases of bacillary dysentery. Most of these occurred in the Truxillo Railroad Division, and mainly in one district. With the object of determining the strains of the organism responsible for the dysentery, Dr. H. C. Clark visited this division and took cultures from 11 cases. Owing largely to delays from stormy weather, and other causes, he experienced considerable difficulty in getting his cultures to the laboratory for investigation, and in consequence, only five of the cases proved positive for organisms. These, having been classified according to the scheme recommended by Thjttá, were found to belong to the following groups:

Group 1 (*Bacillus* of Shiga).

Group 2 (Flexner, Y, Strong, Hiss-Russell, etc.).

Group 3 (*Bacillus* of Sonne).

Cases Numbers 3, 9 and 11 produced colonies of *B. dysenteriae* belonging to Group 2. They fermented glucose and mannite, and left lactose and saccharose unchanged. They agglutinated against *B. dysenteriae* (Y) serum.

Case Number 10 produced colonies of *B. dysenteriae* on Endo plates and semi-solid sugar-agars which appeared to be of the Shiga type, or of Group 1. Glucose was fermented, but none of the other plates revealed a change. We have no serum against which this can be tested. It did show, however, some degree of agglutination against Group 1 serum.

Case Number 4 revealed a growth which on Endo plates and the sugars acted like a Group 2 member, but it would not agglutinate against the serum for this group. The colonies were slightly larger than in the other cases, and were pale blue and dense.

The long delay enforced by stormy weather prevented the return to Tela Hospital Laboratory, and made it impossible to fish off the colonies as early as desired; most of the clinical cases examined were in the late stage of convalescence. It is therefore possible that we failed to discover growths in some patients who were true cases of bacillary dysentery.

AMEBIC DYSENTERY

Amebic dysentery is caused by *Entameba histolytica*, one of the lowest forms of animal organisms, which gains access to the digestive tract through food and water. The eating of unwashed vegetables is believed frequently to cause this type. The infectious agent usually is conveyed to the food and water by insects, particularly house flies. These may carry the spores mechanically, on their bodies; they may eject them from their vomit; or they may emit them through the alimentary canal, in the feces. The lesions are usually confined to the large intestine, including the appendix and the rectum, and consist of undermining ulcers associated with thickening of the walls. In the early stages the lesions are exceedingly small, but they rapidly extend throughout the sub-mucous membrane and lead to a sloughing of the overlying mucous coat. At times the ulceration may extend throughout all the coats of the intestine, causing adhesive or perforative peritonitis. The ulcers, which may be either few in number or very numerous, gradually coalesce and form extensive ulcerative lesions, accompanied by sloughing of large areas of the mucous membrane. This condition may include large blood vessels and consequently cause severe hemorrhages, which may result fatally.

The symptoms depend upon the number of the ulcers, and the activity of the organisms involved. When there are not more than a few ulcers there may be no subjective symptoms, or only an occasional griping pain and a dysenteric stool. On the other hand, when a great many ulcers are present and the organisms are very active, the dysenteric symptoms may be extremely severe and soon result in prostration and death. When the lesions involve the rectal mucous membrane, tenesmus, or straining at stool, is a marked symptom of the disease. Between these two extremes all degrees of symptoms may be present. Only the severe forms of the disease are associated with fever, which rarely exceeds 100° F. Frequently a thickened bowel may be palpated through the abdominal walls and will prove painful to pressure.

The stools generally contain a great deal of bloody mucus and pus, and their odor is offensive. A microscopical examination of a particle of the bloody mucus will generally reveal the organisms. They are highly distinctive in appearance and usually contain red blood cells, which differentiate them from other forms of intestinal *Entameba*. The latter are frequently found, but do not cause ulcerative lesions with dysenteric symptoms. As a rule, toxicity is not as characteristic a feature of amebic dysentery as it is of bacillary dysentery.

Sometimes the disease becomes chronic, in which case it may last for years with intermittent dysenteric symptoms. The patients become chronic carriers, and continue to pass large numbers of characteristic spores, through which the infection is conveyed to others. It is only rarely that the disease assumes epidemic form—the cases generally occurring only sporadically.

PROPHYLAXIS

In districts where amebic dysentery is prevalent, it is very important to see that food is properly cooked and the water supply wholesome, and both food and water supply should be protected against the possibility of infection by flies or other insects.

TREATMENT

In the treatment of this affection a preliminary dose of castor oil should be given; the patient should immediately be put to bed and limited to a liquid diet, preferably milk. If tenesmus and griping pains are very severe, a hypodermic of morphine and atropine is indicated; such treatment should not be repeated except to cope with urgent indications. Emetine hydrochloride, hypodermically administered, should be given as follows:

A half-grain immediately and, if no untoward symptoms result, it should be followed in a few hours by an injection of one grain. This dose may be repeated twice daily, until 9 or 10 grains shall have been given. Some physicians prefer to give half a grain, twice daily, for 9 or 10 days; the drug should then be withheld. Concurrently with the emetine treatment, bismuth subnitrate is prescribed. This should be given in a heaping teaspoonful dose (180 to 200 grains) every three or four hours, and mechanically stirred in a tumbler of plain water (or better still aerated water). The dose should be continued until the stools begin to form. The administration of the bismuth may then be limited to three times daily, and a generous diet may be gradually initiated. Generally the patient is perfectly well within three or four weeks.

Relapses rarely occur under the bismuth method of treatment if it is properly carried out. We do not know in what manner the bismuth subnitrate acts, but it is believed to form a chemical combination with the nascent sulphur of the bowel contents, and it has been stated that free sulphur is necessary to the development of the entameba. We do know, however, that under the influence of the bismuth the dysenteric stools and their flora change in character within twenty-four hours, and that the final results are exceedingly gratifying, even in the most chronic cases. Some authorities still advise the use of ipecac in large doses, but the frequent untoward effects and discomforts, as well as the uncertainty as to results, are definitely discouraging. The use, as formerly, of rectal irrigating fluids consisting of solutions of quinine, silver salts, iodine and other agents, is neither necessary nor of practical value. Moreover, we no longer need to resort to surgical measures, opening the cecum or appendix for irrigating purposes.

AMEBIC ABSCESS OF THE LIVER.

Occasionally from ulcerative lesions the organisms enter the portal circulation, lodging in the liver—more rarely in the spleen—and initiating abscesses, single or multiple. Alcoholic excesses, exposure to cold, and other causes of debilitation are supposed to be instrumental in the origin of these abscesses. The abscess formation may be either acute or chronic in character, and the symptoms vary greatly. The liver shows enlargement, local or general, and if the abscess is located near the surface the liver itself will cause pain from local peritonitis. Sometimes in the more chronic forms the abscess, as a result of great increase in size, may be palpated through the abdomen, and may rupture into adjacent cavities—peritoneal or pleural. In such an instance peritonitis may ensue or adhesions form with other viscera, into which the abscess may discharge. In the case of the pleura, adhesive inflammation with the lung may cause the abscess to rupture into it; another abscess may thus be formed which may burrow to a bronchus, and rupture into it. Spontaneous recovery may follow. Following the development of an abscess of the lung, the organisms occasionally gain access to the brain, where another abscess is formed, causing death.

The temperature is usually remittent in character, and varies exceedingly according to whether the development of the abscess is acute or chronic. In the milder forms the high point is somewhere from 99 to 101 degrees; in the acute forms 104 to 105 degrees are frequently met with. All gradations of temperature between normal and 105 degrees occur.

The treatment of liver abscess depends upon whether or not it is diagnosed early or late in its development. Many authorities believe that, if it is recognized early, a course of emetine hydrochloride will abort the development and cure the abscess. In all cases, however, a course of emetine should be given; and if an abscess develops, surgical interference is necessary.

TYPHOID FEVER

Most of the reported cases of this disease are sporadic, but as an indication of how even sporadic cases may develop independently of infection by flies or by direct contamination, the Superintendent of the Banas Division reports the following case:

In a small farm in Mulas District (about eight miles from Banas) lives a family consisting of man and wife, eight children and mother-in-law. They used to drink water from a well in their own yard, and had enjoyed very good health. During this year their well dried up, and they began to drink water from a brook about 300 yards from their house. Eight days after this, four daughters and a son developed typhoid fever at the same time; one of the children died on the fourteenth day. The rest of the family were vaccinated, and escaped the disease.

TREATMENT OF PRURITUS ANI AND OF SOME PARASITIC SKIN INFECTIONS

Pruritus ani, commonly known as "itching piles," is an affection localized about the anal orifice, and is associated with intense itching. The disease occurs from middle life to old age, and is more often found among males than among females. The itching is intermittent, usually worst at night. It is so intense that it causes loss of sleep and nervous conditions sufficiently serious to make the life of the sufferer almost unbearable. Naturally the itching leads to scratching, with a resulting dermatitis more or less severe, which, in chronic cases, extends from the anal orifice to adjoining parts.

The affection, generally associated with digestive disturbances, occurs principally among people of sedentary occupations. The writer has observed a large number of cases, and has found that results have proved the following method of treatment sufficiently satisfactory to warrant recommending it to others:

First, correct the digestive disturbances by giving a well-balanced diet, excluding all kinds of sweet foods and drinks. The administration of 15 drops of dilute nitric acid, with half a dram of essence of pepsin, in a tumbler of water before meals, greatly hastens the desired result. Moreover, immediate relief from the itching sensation and the cure of the patient in from a few days to a few weeks, according to the chronicity of the affection, are brought about by the use of the formula given herewith:

FORMULA

Salicylic acid	4%
Bismuth subnitrate	10%
Mercury salicylate	4%
Oil of eucalyptus	10%
Lanolin and vaseline sufficient to make up the 100%	

The ingredients of this ointment should be thoroughly incorporated, and should be rubbed vigorously into the itching parts each night.

During an extensive experience in the Canal Zone, Panama, the writer used the same ointment with very satisfactory results in the treatment of the exceedingly common disease known as Dhobie's Itch, or Tinea cruris. This is caused by the fungus *Epidermophyton cruris*, or *inguinale*, which affects the inguinal and axillary regions. Usually three or four thorough applications will cure the affection. This excellent preparation, which is now used extensively in the Tropics, is locally known as "Dhobie ointment."

It is equally effective in the treatment of (1) superficial skin infections caused by fungi of the *Tricophyton* group; (2) pustular dermatitis caused by *staphylococcus*, which is frequently met with; and (3) some forms of chronic leg-ulcers (recently successfully treated).

In this last group the sound skin is protected with vaseline, and the ointment

is applied on lint, the treatment being repeated daily. Every fresh application is superimposed on the preceding.

TREATMENT OF ERYSIPELAS

In the Tropics we occasionally meet with cases of erysipelas having manifestations similar to those of the disease as it occurs in more northerly climates. The method of treatment which we follow, and which has produced brilliantly successful results, was not original with us. It is worthy of notice because of its simplicity and effectiveness:

An inch of the inflamed area, including blebs, as well as at least one inch of the sound skin surrounding, is swabbed with pure carbolic acid, which within five or ten seconds produces a white coating over the painted area. Immediately upon the appearance of this coating, which is accompanied by a burning sensation, pure alcohol is applied. The burning sensation at once ceases, and within from three to six hours the temperature drops to normal. As a rule, no other treatment is necessary. If, however, the carbolic acid is not carried far enough on the sound skin (and this occasionally happens in areas on the scalp or about the external ear) a fresh exacerbation may occur, and it will then be necessary to make another application over the newly invaded area.

HERPES ZOSTER

The same brilliant results obtained through this method of treating erysipelas with carbolic acid and alcohol are obtainable also in the case of herpes zoster. The whole zone of eruption, including the vesicles, is painted over as already described. If the area is very extensive it is better to treat sections of it consecutively. Otherwise the action of the carbolic acid might be excessive before the operator could neutralize its effect with alcohol. The advantages of this method of treating herpes zoster are that no other treatment, either internal or external, is necessary; that herpetic eruption heals without scars; and that it is never followed by post-herpetic neuralgia. In a few days the superficial skin peels off, leaving a perfectly smooth surface.

VENEREAL DISEASE

Preventive medicine is confronted with no more serious problem than to control the spread of those infectious diseases (syphilis, gonorrhea and chancre) which are grouped together as venereal diseases because they are acquired mainly through sexual intercourse. Though caused by different organisms, these diseases seriously affect our morbidity and mortality rates. A survey of their prevalence in one of our divisions, by Dr. H. C. Clark, may be taken as a fairly good index of conditions existing in this respect in the American Tropics. His detailed report appears in Section V.

In order to compare the incidence of these diseases in the United States with that shown in Dr. Clark's findings, we quote from Rosenau's "Preventive Medicine and Hygiene," concerning its prevalence here. The summary of the conclusions of Rosenau on the ultimate results that are prone to follow the two most serious infections is also given. As he states, "Gonorrhea is the great preventor, syphilis the great destroyer, of life."

Morrow states that 75 per cent of adult males acquire gonorrhea at some time, and that from 5 to 10 per cent acquire syphilis; these figures are based, not alone on his own observations, but on the opinion of such men as Heisser and Fournier. Zinsser estimates that 10 per cent of the men registered for draft under the Selective Service acts were actively infected. There were 24,234,021 men between 18 and 45 registered. It is conservatively estimated that of this number 2,600,000 were diseased, of whom 500,000 were syphilitic.

Syphilis affects about 8 per cent of the total population, occurs at all ages and in all classes of society, is the cause of from 10 to 35 per cent of all insanity, and is one of the causes of mentally and physically deficient children. It is the cause of locomotor ataxia, paresis, and the chief cause of apoplectic strokes in early life; is responsible for a large proportion of diseases of the heart and blood vessels; and is the cause of nearly half the abortions and miscarriages. Syphilis decreases the length of life about one third; it also lowers the standard of health and paves the way for other diseases; it greatly decreases earning capacity; is the most serious cause of disruption of home and happiness, and causes untold suffering and misery. Withal, it is preventable and curable. The public-health control of syphilis depends upon early diagnosis and facilities for prompt treatment.

Gonorrhea is the most constantly prevalent of all serious infectious diseases, except measles; affects all ages and all classes of society; is responsible for from 6,000 to 10,000 cases annually of blindness in the United States; is the cause of 60 per cent of blindness of the new born; is the cause of more than 10 per cent of all blindness; is the cause of from 60 to 75 per cent of surgical operations on the female generative organs; of 50 per cent of sterility; of many chronic diseases of the joints, bladder and generative organs; greatly decreases earning capacity; is the underlying cause of untold suffering and misery; and affects practically all prostitutes, public and clandestine. Notwithstanding, gonorrhea is a preventable disease.

The tables of classification of diseases (pages 94-113) do not by any means give us a true estimate of their incidence on our plantations, for the reason that they frequently complicate other serious conditions for which patients are sent to the hospital to be treated, and hence the original diseases do not appear in our classification tables. For example, a man may enter the hospital with a fractured leg, and at the same time have a malarial and syphilitic infection. In our classification tables, his admission would be attributed solely to the fractured leg, although the other diseases necessarily were treated at the same time. On page 154 of Dr. Clark's report the percentage of probable syphilitic infections is tabulated, as determined among different races comprising our plantation population.

In our discussion of malaria we referred to the difficulties that are encountered in the curing of malarial infections complicated by syphilis unless the presence

of such infection is recognized and combination treatment is initiated. When, therefore, the combination of these conditions exists in such a large percentage of hospital admissions, convalescence is delayed and there is an increase in the number of days required for hospital treatment.

The problems relative to preventive measures for the control of these infectious diseases are complex, and there can be no solution until the public becomes thoroughly cognizant with the gravity of the infections, as regards not only themselves but also their families. Nor is this all. People must discard prudery and false modesty; insist upon government regulations requiring, under severe penalty, that every case shall be reported, like any case of smallpox, yellow fever or other infectious disease that is a menace to the community; and demand careful isolation and skilled treatment until the infectious stage shall be past. Such rules should apply, of course, to men, and particularly to women who lend themselves to promiscuous intercourse. We cannot legally regulate the moral standards of mankind, but we can enact laws to prevent the dissemination of diseases that impede the progress of civilization and lead to physical degeneration, untold misery and premature death, of which only too frequently the innocent are the victims.

NEW METHODS OF TREATMENT

Our Medical Superintendent in Panama reports on the use of Mercurochrome as follows:

We have been using this drug in 2% solution for several months, and consider it very efficient when used in its various indications. After bladder lavage with boric-acid solution (in non-tuberculous cystitis) it is our custom to leave $\frac{1}{2}$ ounce of this solution in the bladder. The results are very satisfactory. Once, in a case of periostitis of one of the phalanges, as a last resort it was injected with a blunt needle about the infected tissues. Marked improvement took place within 24 hours, and healing was effected within 72 hours. There has been no recurrence of the trouble during the past two months. Incised wounds are mechanically cleaned, flooded with mercurochrome solution, and closed. In the case of practically all fresh incised wounds, even though they be polluted, we obtain healing by first intention. This treatment for various infected wounds appears to give better satisfaction than the methods which we have previously used. The principal objection, which after all is minor, is that clothing and bedding are necessarily stained.

Attention is also directed to an article, in the *Journal of the American Medical Association*, of March 1, 1924, by Hugh H. Young, M.D., and Justina H. Hill, M.S., of Baltimore, on the "Treatment of Septicemia and Local Infections by Intravenous Injections of Mercurochrome."

PICRIC ACID

The use of iodine in preparing the field for operation has been discontinued in the Panama Division, and an 8 per cent alcoholic solution of picric acid substituted. (A 5 per cent solution is generally used in the United States.) This is applied, without other preparation, in the operating room just previous to operation. Since its use has been instituted there have been no cases of stitch abscess or skin infections in clean laparotomies. The objection is like that regarding mercurochrome; it stains bedding and clothing even several days after operation. In operating rooms where artificial light is used, it is better to apply the solution before turning on the lights, as the field that has been touched can be better seen in a diffuse natural light than under brilliant electric light. We highly recommend this preparation as effective in preventing the aggravating skin infections that occur in cases of even the best operators, which would otherwise show perfect results.

HEMOGLOBINURIC FEVER TREATED WITH ANTI-STREPTOCOCCUS SERUM

The following is a report of a case of hemoglobinuric fever treated with anti-streptococcus serum by Dr. Alberto F. Ruiz, of the Banes Division:

C. A., female, age 17 years, Cuban, was under treatment by another physician, and had been given up as a hopeless case when first seen by Dr. Ruiz, on February 24.

Family history: Father, Spaniard, age 45 years, perfectly healthy. Mother, Cuban, died 16 years before, at the age of 35, from Bright's disease. One sister living, who suffers from chronic tonsillitis.

Personal history: At the age of 5, suffered from fever and general edema; at 10 years had measles; in the 14th year suffered from intermittent fever for eight months, and subsequently was in poor health until the onset of the present illness.

History of present illness: For three weeks she had had chills, accompanied by high fever and bilious vomiting. The chills were on alternate days. For the past two weeks she has been taking 5 grains of quinine every two hours. Vomiting has been persistent every morning, and for the last five days the vomiting contained blood, at times almost pure. On February 23 she became deeply jaundiced, and in the afternoon passed black urine. That night she was seen by her attending physician, who gave her a hypodermic of quinine (grains 15). After this, vomiting became worse and the patient could not keep anything on her stomach. The urine became scanty, and to all appearance was absolutely black in color. On the 24th, the same physician gave her another hypodermic of quinine (15 grains) and a hypodermoclysis of normal saline 500 c.c., with cardiac stimulants, and then pronounced the case hopeless.

On the same day, February 24, Dr. Ruiz saw her at 6 P.M. She then had a temperature of 102; pulse 140; respiration 30. The skin was deep yellow, also the conjunctivæ and buccal mucous membranes. The tongue was covered with a thick yellow coating, and the patient was very restless. A soft systolic murmur was heard over the mitral area of the heart; the lungs were normal; the spleen was hard and could be palpated two finger-breadths below the costal margin; the liver was also slightly enlarged; vomiting was persistent; the urine was black and very scanty.

All forms of medication previously given were discontinued, and an intravenous injection of 20 c.c. of anti-streptococcus serum (Squibbs) was administered intravenously by Dr. Ruiz. At the same time a high enema of normal saline 250 c.c. was given, but was not retained. She was seen again by Dr. Ruiz five hours later. In the interval she had passed about 150 c.c. of clear urine, her temperature was 100.4; pulse 120; she was quieter, and slept at intervals. The next morning, February 25, at 7 o'clock, her temperature was 100; pulse 126; and vomiting had ceased. At 10 A.M. she was admitted to the hospital, and after a long search one estivo-autumnal parasite was found in her blood. She was then given another intravenous injection of 20 c.c. of anti-streptococcus serum. After the second injection the quantity of urine gradually increased, and in a few days became normal; the vomiting gradually ceased, and on the 27th the administration of quinine by mouth was resumed without any untoward effects. On the fifth day after admission to the hospital her temperature was normal, the patient was apparently convalescent, and she was discharged on March 3.

The next morning she suffered from another attack of fever, with bilious vomiting, and passed a considerable quantity of black urine. The jaundice, which had cleared up after the previous attack, reappeared. She was readmitted to the hospital, with a temperature of 103.6; pulse 136; and respiration 24. Careful examination of the blood failed to disclose parasites. She was again given 20 c.c. of anti-streptococcus serum, intravenously, and no other medication was administered. The following morning her temperature was 99.2; pulse 112; and respiration 20. During the day she passed about 700 c.c. of normal urine. Another intravenous injection of the serum was given, and the next day her temperature became normal, and remained so. She was discharged on March 12, apparently perfectly well.

This method of treatment was first brought to my attention by Dr. S. T. Darling, of Leesburg, Georgia, who has kindly given me the following history as to how, and by whom, it was originated; also the rationale of the treatment:

The treatment was first used in this region, or anywhere else so far as I know, by Dr. O. G. Cranford, of Sasser, Terrell County, Georgia. Dr. Cranford noted the toxic symptoms which some of his hemorrhagic or blackwater fever cases presented, and thought that the disease might be complicated by streptococcus septicemia. He used anti-streptococcic serum in treating several cases subsequently. A colleague, Dr. O. W. Statham, of Lee County, Georgia, observing the good results obtained by Dr. Cranford, instituted the treatment in his county, where malaria and blackwater fever have been very severe. They report excellent results from this mode of treatment. I have had the literature searched, and find that horse serum has been used recently by English, French and Central American physicians.

The rationale of the treatment seems to be: that normal blood contains both hemolytic and anti-hemolytic substances; in blackwater fever and in paroxysmal hemoglobinuria the anti-hemolytic substance is at fault. The injection of normal horse serum, or of anti-streptococcic horse serum, supplies the anti-hemolytic substance and thus prevents hemolysis. I have seen a number of cases the past year. They are undoubtedly true blackwater fever of malarial origin. Most of them have recovered, but some of them have died in spite of the treatment. It may be that the horse serum prevents further hemolysis but does not prevent nor arrest the degenerative changes in the renal epithelium, which often lead to suppression. I am not so sanguine about the specificity and great value of the treatment at this moment as I was in midsummer, but I am still strongly inclined to recommend the treatment to every one in regions where this disease occurs.

Dr. Statham's success has been even better than that of Dr. Cranford. He gives the serum without a moment's delay, and withholds quinine in every case. It is more convenient to use anti-streptococcic serum, because this is a normal horse serum plus streptococcus anti-bodies. Diphtheria antitoxin probably could not be used, because this often consists of globulins, and not of the whole serum.

I am very glad that you have received a report of the favorable outcome of a case treated by this method. I am sure that you and your men will be able to pursue the matter thoroughly and ascertain what the merits of the treatment are, for I believe it should be given an extended trial.



Field Sports, Panama Division

SECTION IV

STATISTICS

FOR TEN YEAR PERIOD 1914 TO 1923 INCLUSIVE

EXPLANATORY NOTES

Whenever these abbreviations are used in the following tables, their meaning is as indicated below:

M.—Male.
F.—Female.
W.—White.
C.—Colored.
Emp.—Employee
Non-emp.—Non-Employee.
Pass.—Passenger.
O.—Office Calls.
V.—Visits.
D.—Deaths.
N. Y.—New York.
N. O.—New Orleans.

Referring to the names of certain divisions which do not indicate the name of the country where located, the following explanation is given: Banes and Preston divisions are located in Cuba; and the Tela Railroad Division and the Truxillo Railroad Division in Honduras.

The chart numbers referred to in some of the tables are taken from the "International List of the Causes of Sickness and Death." These chart numbers are used universally by public health and city and state health departments and organizations.

The term "Employees" covers all persons appearing on our pay-rolls, including laborers and others employed on a part-time or hourly basis.

The term "Members of Families of Employees" includes all dependent persons in the families of our employees.

The term "Non-Employees" includes all persons covered by the classifications "Members of Families of Employees" and "Other Non-Employees."

The term "Other Non-Employees" includes all persons dependent upon us for medical attention, and not covered in the classifications "Employees" and "Members of Families of Employees."

SUMMARY OF WORK DONE

	Banes Division		Colombia Division		Costa Rica Division	
	M.	F.	M.	F.	M.	F.
PERSONS DEPENDENT UPON THE MEDICAL DEPARTMENT FOR TREATMENT:						
Employees:						
White	2,719	25	1,631	53	2,387	62
Colored	2,806	37	3,626	97	4,016	86
Members of families of employees:						
White	2,059	2,767	1,509	896	1,253	2,166
Colored	937	1,090	1,815	885	1,862	3,301
*Other Non-employees:						
White	3,566	4,338	1,224	903	2,852	5,782
Colored	1,766	2,922	2,661	1,998	1,287	2,488
Totals:	W.	C.	W.	C.	W.	C.
Employees	2,744	2,843	1,684	3,723	2,449	4,102
**Non-employees	12,730	6,715	4,532	7,359	12,053	8,938
TOTAL	15,474	9,558	6,216	11,082	14,502	13,040
Passengers on steamships	—	—	—	—	—	—
Officers, crew and ship's laborers	—	—	—	—	—	—
TOTAL	—	—	—	—	—	—
GRAND TOTAL	—	—	—	—	—	—
PATIENTS TREATED IN HOSPITALS:						
Employees:	M.	F.	M.	F.	M.	F.
White	251	4	468	7	2,326	42
Colored	1,250	5	2,443	41	833	17
**Non-employees:						
White	76	24	46	17	439	297
Colored	106	27	30	23	137	158
Total:	W.	C.	W.	C.	W.	C.
Employees	255	1,255	475	2,484	2,368	850
**Non-employees	100	133	63	53	736	295
GRAND TOTAL	1,743		3,075		4,249	
PATIENTS TREATED IN HOSPITAL DISPENSARIES:						
Employees:	M.	F.	M.	F.	M.	F.
White	2,314	8	1,692	84	3,032	62
Colored	1,560	32	7,540	295	3,515	71
**Non-employees:						
White	1,053	1,764	530	690	684	650
Colored	412	713	565	843	178	508
Total:	W.	C.	W.	C.	W.	C.
Employees	2,322	1,592	1,776	7,835	3,094	3,586
**Non-employees	2,817	1,125	1,220	1,408	1,334	686
GRAND TOTAL	7,856		12,239		8,700	
TREATMENTS IN HOSPITAL DISPENSARIES:						
Employees:	M.	F.	M.	F.	M.	F.
White	6,461	29	2,896	120	5,253	130
Colored	4,996	90	14,435	486	5,642	106
**Non-employees:						
White	2,627	4,365	769	960	903	926
Colored	919	1,764	879	1,155	278	759
Total:	W.	C.	W.	C.	W.	C.
Employees	6,490	5,086	3,016	14,921	5,383	5,748
**Non-employees	6,992	2,683	1,729	2,034	1,829	1,037
GRAND TOTAL	21,251		21,700		13,997	

WITH VITAL STATISTICS

Guatemala Division		Jamaica Division		Panama Division		Preston Division		Tela Railroad		Truxillo Railroad		Total
M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	
147	8	151	12	190	5	1,579	17	276	11	370	8	9,651
3,218	102	9,264	1,731	4,152	129	4,108	87	5,283	78	6,085	83	44,988
50	50	76	112	52	143	677	1,145	66	126	27	63	13,237
1,000	1,000	4,505	6,884	835	2,051	1,015	2,039	200	450	166	1,713	31,748
700	400	9	6	47	51	1,417	1,417	100	50	12	13	22,887
6,000	4,500	—	1	1,592	2,028	3,583	3,583	500	500	135	158	35,702
W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	
155	3,320	163	10,995	195	4,281	1,596	4,195	287	5,361	378	6,168	54,639
1,200	12,500	203	11,390	293	6,506	4,656	10,220	342	1,650	115	2,172	103,574
1,355	15,820	366	22,385	488	10,787	6,252	14,415	629	7,011	493	8,340	158,213
—	—	—	—	—	—	—	—	—	—	—	—	46,017
—	—	—	—	—	—	—	—	—	—	—	—	30,698
—	—	—	—	—	—	—	—	—	—	—	—	76,715
—	—	—	—	—	—	—	—	—	—	—	—	234,928
M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	
172	3	28	—	140	1	323	6	192	6	349	—	4,318
2,370	51	8	1	2,054	65	1,124	13	2,206	24	6,167	17	18,689
154	62	11	2	36	57	89	108	128	221	48	33	1,848
713	371	—	1	231	506	57	76	166	444	135	362	3,543
W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	
175	2,421	28	9	141	2,119	329	1,137	198	2,230	349	6,184	23,007
216	1,084	13	1	93	737	197	133	349	610	81	497	5,391
3,896		51		3,090		1,796		3,387		7,111		28,398
M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	
495	13	344	30	963	18	1,266	17	1,756	211	1,294	18	13,617
5,515	260	1,877	326	2,788	144	2,111	102	4,964	403	14,507	114	46,124
239	260	343	229	189	416	472	663	365	540	55	179	9,321
926	688	605	492	321	741	412	716	492	1,119	128	541	10,400
W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	
508	5,775	374	2,203	981	2,932	1,283	2,213	1,967	5,367	1,312	14,621	59,741
499	1,614	572	1,097	605	1,062	1,135	1,128	905	1,611	234	669	19,721
8,396		4,246		5,580		5,759		9,850		16,836		79,462
M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	
558	14	752	76	1,073	26	2,925	24	2,040	294	1,954	51	24,676
5,985	323	3,373	488	3,260	162	4,588	198	7,575	604	24,769	288	77,368
268	288	446	327	257	467	948	1,093	514	837	87	301	16,383
994	772	632	522	476	872	833	1,205	658	1,495	291	844	15,348
W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	
572	6,308	828	3,861	1,099	3,422	2,949	4,786	2,334	8,179	2,005	25,057	102,044
556	1,766	773	1,154	724	1,348	2,041	2,038	1,351	2,153	388	1,135	31,731
9,202		6,616		6,593		11,814		14,017		28,585		133,775

SUMMARY OF WORK DONE

TREATMENTS IN FIELD DISPENSARIES:

	Banes Division		Colombia Division		Costa Rica Division	
Employees:	M.	F.	M.	F.	M.	F.
White	212	8	1,452	24	4,777	98
Colored	136	7	16,262	332	2,870	32
**Non-employees:						
White	38	96	22	116	11	34
Colored	10	21	113	287	17	32
Total:	W.	C.	W.	C.	W.	C.
Employees	220	143	1,476	16,594	4,875	2,902
**Non-employees	134	31	138	400	45	49
GRAND TOTAL	528		18,608		7,871	

TOTAL NUMBER OF TREATMENTS IN HOSPITAL AND FIELD DISPENSARIES:

	M.	F.	M.	F.	M.	F.
Employees:						
White	6,673	37	4,348	144	10,030	228
Colored	5,132	97	30,697	818	8,512	138
**Non-employees:						
White	2,665	4,461	791	1,076	914	960
Colored	929	1,785	992	1,442	295	791
Total:	W.	C.	W.	C.	W.	C.
Employees	6,710	5,229	4,492	31,515	10,258	8,650
**Non-employees	7,126	2,714	1,867	2,434	1,874	1,086
GRAND TOTAL	21,779		40,308		21,868	

NUMBER OF HOSPITAL DAYS:

	M.	F.	M.	F.	M.	F.
Employees:						
White	3,851	44	4,234	66	25,733	435
Colored	17,603	33	27,551	416	12,723	214
**Non-employees:						
White	824	1,179	395	158	5,449	3,263
Colored	481	321	322	290	1,792	2,255
Total:	W.	C.	W.	C.	W.	C.
Employees	3,895	17,636	4,300	27,967	26,168	12,937
**Non-employees	2,003	802	553	612	8,712	4,047
GRAND TOTAL	24,336		33,432		51,864	

NUMBER OF TREATMENTS ABOARD PASSENGER STEAMSHIPS . . .

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NUMBER OF TREATMENTS BY PORT MEDICAL OFFICERS

- - - - -

NUMBER OF SEAMEN AND APPLICANTS EXAMINED BY PORT MEDICAL OFFICERS

- - - - -

MEDICAL DEPARTMENT

69

WITH VITAL STATISTICS—Continued

[illegible]

SUMMARY OF WORK DONE

	Banes Division	Colombia Division	Costa Rica Division
DEATHS, HOSPITALS:			
Employees:			
White.	14	8	41
Colored	44	87	39
**Non-employees:			
White.	15	3	38
Colored	9	1	29
Total:			
Employees.	58	95	80
**Non-employees	24	4	67
GRAND TOTAL	82	99	147
DEATHS, HOSPITAL DISPENSARIES:			
Employees:			
White.	1	2	5
Colored	2	2	4
**Non-employees:			
White.	5	1	5
Colored	1	1	5
Total:			
Employees.	3	4	9
**Non-employees:	6	2	10
GRAND TOTAL	9	6	19
DEATHS, FIELD DISPENSARIES:			
Employees:			
White.	—	1	1
Colored	—	1	2
**Non-employees:			
White.	—	—	1
Colored	—	—	—
Total:			
Employees.	—	2	3
**Non-employees	—	—	1
GRAND TOTAL	—	2	4
DEATHS, HOSPITALS AND ALL DISPENSARIES COMBINED:			
Employees:			
White.	15	11	47
Colored	46	90	45
**Non-employees:			
White.	20	4	44
Colored	10	2	34
Total:			
Employees.	61	101	92
**Non-employees	30	6	78
GRAND TOTAL	91	107	170
DEATHS, STEAMSHIP SERVICE:			
Passengers.	—	—	—
Officers, crew and ship's laborers	—	—	—
TOTAL	—	—	—
GRAND TOTAL — DEATHS OF PATIENTS TREATED:			
(Steamship service included)	—	—	—
AVERAGE DAILY NUMBER OF PATIENTS IN HOSPITALS:			
Employees:			
White.	10.67	11.78	71.69
Colored	48.32	76.62	35.44
**Non-employees:			
White.	5.49	1.51	23.87
Colored	2.20	1.68	11.09

WITH VITAL STATISTICS—*Continued*

Guatemala Division	Jamaica Division	Panama Division	Preston Division	Tela Railroad	Truxillo Railroad	Total
—	—	1	7	2	3	76
59	—	53	90	55	143	570
1	—	2	18	4	5	86
43	—	24	15	44	41	206
59	—	54	97	57	146	646
44	—	26	33	48	46	292
<u>103</u>	<u>—</u>	<u>80</u>	<u>130</u>	<u>105</u>	<u>192</u>	<u>938</u>
—	—	—	2	—	—	10
—	1	1	13	—	—	23
—	—	—	14	—	—	25
—	—	—	34	—	—	41
—	1	1	15	—	—	33
—	—	—	48	—	—	66
<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>
—	1	1	63	—	—	99
—	—	—	—	—	—	2
—	16	—	3	—	8	30
—	—	—	—	—	—	1
—	13	—	3	—	—	16
—	16	—	3	—	8	32
—	13	—	3	—	—	17
<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>
—	29	—	6	—	8	49
—	—	1	9	2	3	88
59	17	54	106	55	151	623
1	—	2	32	4	5	112
43	13	24	52	44	41	263
59	17	55	115	57	154	711
44	13	26	84	48	46	375
<u>103</u>	<u>30</u>	<u>81</u>	<u>199</u>	<u>105</u>	<u>200</u>	<u>1,086</u>
—	—	—	—	—	—	3
—	—	—	—	—	—	6
—	—	—	—	—	—	9
—	—	—	—	—	—	1,095
4.40	.92	3.92	13.08	4.86	10.02	131.34
65.85	.30	68.61	47.76	98.98	177.76	619.64
5.68	.67	2.11	6.94	12.15	2.26	60.68
28.02	.02	21.08	3.33	17.97	13.63	99.02

SUMMARY OF WORK DONE

	Banes Division	Colombia Division	Costa Rica Division
Total:			
Employees	58.99	88.40	107.13
**Non-employees	7.69	3.20	34.96
GRAND TOTAL	66.68	91.60	142.09
AVERAGE DAILY NUMBER OF TREATMENTS IN HOSPITAL DISPENSARIES AND FIELD DISPENSARIES:			
Employees:			
White	18.38	12.30	28.10
Colored	14.32	86.34	23.70
**Non-employees:			
White	19.52	5.12	5.13
Colored	7.44	6.67	2.97
Total:			
Employees	32.71	98.65	51.80
**Non-employees	26.96	11.79	8.11
GRAND TOTAL	59.67	110.44	59.91
DEATH RATE PER THOUSAND PERSONS DEPENDENT ON THE COMPANY FOR TREATMENT (Steamship employees and passengers not included):			
Employees:			
White	5.47	6.53	19.19
Colored	16.18	24.17	10.97
**Non-employees:			
White	1.57	0.88	3.65
Colored	1.49	0.27	3.80
Total:			
Employees	10.92	18.68	14.04
**Non-employees	1.54	.50	3.72
GRAND TOTAL	3.64	6.19	6.17
REPATRIATIONS:			
Employees	5	49	1
Non-employees	—	—	—
GRAND TOTAL	5	49	1
AVERAGE NUMBER HOSPITAL DAYS ANNUALLY PER EMPLOYEE . . .	3.85	5.97	5.97
HOSPITAL ADMISSION RATE ANNUALLY PER THOUSAND EMPLOYEES .	270	547	491
AVERAGE NUMBER DISPENSARY TREATMENTS ANNUALLY PER EMPLOYEE	2.14	6.66	2.89
AVERAGE NUMBER OF EMPLOYEES NON-EFFECTIVE, PER THOUSAND EMPLOYEES	10.56	16.35	16.35
AVERAGE NUMBER OF EMPLOYEES PARTIALLY NON-EFFECTIVE, PER THOUSAND EMPLOYEES	5.85	18.24	7.91

*Persons other than employees, and other than members of employees' families, who rely upon the Company's physicians for medical and surgical treatment.

**Includes "members of families of employees" as well as "other non-employees."

WITH VITAL STATISTICS—*Continued*

Guatemala Division	Jamaica Division	Panama Division	Preston Division	Tela Railroad	Truxillo Railroad	Total
70.26	1.22	72.53	60.84	103.84	187.78	750.99
33.70	.69	23.19	10.27	30.12	15.89	159.71
103.96	1.91	95.72	71.11	133.96	203.67	910.70
2.93	3.42	4.47	9.12	7.79	6.93	93.46
49.29	53.98	32.19	17.06	57.62	92.70	427.20
1.65	2.25	2.04	5.91	3.70	1.08	46.40
7.09	12.05	4.41	6.09	6.18	3.44	56.34
52.22	57.40	36.66	26.18	65.41	99.63	520.66
8.74	14.30	6.45	12.00	9.88	4.52	102.75
60.96	71.70	43.11	38.18	75.29	104.15	623.41
0.00	0.00	5.13	5.64	6.97	7.94	9.12
17.77	1.55	12.61	25.27	10.26	24.48	13.85
10.83	0.00	6.83	6.87	11.70	43.48	3.10
3.44	1.14	3.69	5.09	26.67	18.88	3.90
16.98	1.52	12.29	19.86	10.09	23.53	13.01
3.21	1.12	3.82	5.65	24.10	20.11	3.62
6.00	1.32	7.18	9.63	13.74	22.64	6.86
—	—	19	18	1	11	104
—	—	3	—	—	2	5
—	—	22	18	1	13	109
7.38	.04	5.91	3.83	6.71	10.47	5.02
747	3	505	253	430	998	421
5.48	1.88	2.99	1.65	4.23	5.56	3.48
20.22	.11	16.20	10.51	18.39	28.69	13.74
15.03	5.14	8.19	4.52	11.58	15.22	9.53

RECORD OF

		Banes Division		Colombia Division		Costa Rica Division	
		W.	C.	W.	C.	W.	C.
Remaining from last year	Emp. { M.	9	20	13	49	61	36
	{ F.	0	0	—	—	3	1
	Non- { M.	1	3	2	—	17	12
	emp. { F.	5	—	—	—	7	8
Admitted this year	Emp. { M.	242	1,230	455	2,394	2,265	797
	{ F.	4	5	7	41	39	16
	Non- { M.	75	103	44	30	422	125
	emp. { F.	19	27	17	23	290	150
Discharged	Emp. { M.	242	1,232	460	2,368	2,280	806
	{ F.	4	5	7	39	42	17
	Non- { M.	73	106	45	28	435	135
	emp. { F.	22	26	16	23	292	155
Remaining	Emp. { M.	9	18	8	75	46	27
	{ F.	—	—	—	2	—	—
	Non- { M.	3	—	1	2	4	2
	emp. { F.	2	1	1	—	5	3
Died	Emp.	14	44	8	87	41	39
	Non-emp.	15	9	3	1	38	29
Repatriated	Emp.	—	5	4	42	—	1
	Non-emp.	—	—	—	—	—	—
Total number of hospital days	Emp. { M.	3,851	17,603	4,234	27,551	25,733	12,723
	{ F.	44	33	66	416	435	214
	Non- { M.	824	481	395	322	5,449	1,792
	emp. { F.	1,179	321	158	290	3,263	2,255
Operations with general anesthesia	Emp.	35	36	18	89	53	94
	Non-emp.	54	12	13	13	55	44
Operations with or without local anesthesia	Emp.	148	336	117	794	925	1,042
	Non-emp.	66	20	8	12	125	81

HOSPITALS

Guatemala Division		Jamaica Division		Panama Division		Preston Division		Tela Railroad		Truxillo Railroad		Total		Grand Total
W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	
3	38	1	—	4	64	12	37	4	68	9	143	116	455	571
—	3	—	—	—	2	—	—	—	1	—	—	3	7	10
2	20	—	—	—	6	6	4	4	3	2	3	34	51	85
2	7	—	—	—	8	2	1	5	4	—	10	21	38	59
169	2,332	27	8	136	1,990	311	1,087	188	2,133	340	6,024	4,133	18,000	22,133
3	48	—	1	1	63	6	13	6	23	—	17	66	227	293
152	693	11	—	36	225	83	53	124	163	46	132	993	1,524	2,517
60	364	2	1	57	498	106	75	216	440	33	352	800	1,930	2,730
165	2,323	26	8	138	2,000	310	1,092	183	2,108	344	6,015	4,148	17,952	22,100
3	48	—	1	1	63	6	13	6	24	—	17	69	227	296
149	692	10	—	35	227	85	54	122	157	48	132	1,002	1,531	2,533
60	362	2	1	57	501	105	73	217	429	33	351	804	1,921	2,725
7	47	2	—	2	54	13	32	9	98	5	152	101	503	604
—	3	—	—	—	2	—	—	—	—	—	—	—	7	7
5	21	1	—	1	4	4	3	6	9	—	3	25	44	69
2	9	—	—	—	5	3	3	4	15	—	11	17	47	64
—	59	—	—	1	53	7	90	2	55	3	143	76	570	646
1	43	—	—	2	24	13	15	4	44	5	41	86	206	292
—	—	—	—	—	19	—	18	—	1	—	11	4	97	101
—	—	—	—	—	3	—	—	—	—	—	2	—	5	5
1,577	23,591	336	106	1,426	24,304	4,705	17,290	1,690	35,856	3,658	64,322	47,210	223,346	270,556
31	444	—	5	3	737	68	143	83	271	—	560	730	2,823	3,553
1,473	6,758	204	—	259	2,246	1,352	482	1,851	1,804	501	1,952	12,308	15,837	28,145
601	3,470	41	9	512	5,447	1,180	735	2,582	4,756	324	3,022	9,840	20,305	30,145
20	100	—	2	6	111	73	164	25	145	14	198	244	939	1,183
34	46	2	—	14	129	86	34	82	92	5	36	345	406	751
57	268	4	2	13	1,181	134	413	155	908	59	1,593	1,612	6,537	8,149
42	162	2	—	16	204	55	20	91	174	4	12	409	685	1,094

RECORD OF

		Banes Division		Colombia Division		Costa Rica Division	
		W.	C.	W.	C.	W.	C.
Remaining from last year	{ Emp. { M.	40	31	42	104	53	61
		-	3	4	6	2	4
	{ Non-emp. { M.	31	9	15	21	21	4
		46	20	14	7	25	12
Admitted this year	{ Emp. { M.	2,274	1,529	1,650	7,436	2,979	3,454
		8	29	80	289	60	67
	{ Non-emp. { M.	1,022	403	515	544	663	174
		1,718	693	676	836	625	496
Discharged	{ Emp. { M.	2,253	1,519	1,639	7,313	2,959	3,418
		8	32	81	287	59	63
	{ Non-emp. { M.	1,022	397	507	547	677	174
		1,713	689	668	828	636	499
Remaining.	{ Emp. { M.	61	41	53	227	73	97
		-	-	3	8	3	8
	{ Non-emp. { M.	31	15	23	18	7	4
		51	24	22	15	14	9
Died	{ Emp.	1	2	2	2	5	4
	{ Non-emp.	5	1	1	1	5	5
Repatriated	{ Emp.	-	-	-	3	-	-
	{ Non-emp.	-	-	-	-	-	-
Dispensary treatments	{ Emp. { M.	6,461	4,996	2,896	14,435	5,253	5,642
		29	90	120	486	130	106
	{ Non-emp. { M.	2,627	919	769	879	903	278
		4,365	1,764	960	1,155	926	759
Patients sent to hospital.	{ Emp. { M.	242	1,230	160	476	747	363
		4	5	2	11	13	8
	{ Non-emp. { M.	75	19	20	13	355	87
		103	27	8	12	237	101
Visits to lodgings	{ Emp. { M.	646	272	70	32	514	244
		9	-	-	23	13	5
	{ Non-emp. { M.	690	161	75	13	80	35
		941	278	186	28	130	103
Operations with general anesthesia	{ Emp.	4	1	-	-	-	-
	{ Non-emp.	9	2	-	-	2	4
Operations with or without local anesthesia	{ Emp.	789	667	261	620	1,252	1,395
	{ Non-emp.	428	196	123	83	103	107

*Visits to lodgings made twice weekly.

HOSPITAL DISPENSARIES

Guatemala Division		Jamaica Division		Panama Division		Preston Division		Tela Railroad		Truxillo Railroad		Total		Grand Total
W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	
—	64	17	35	34	81	36	62	165	325	14	361	401	1,124	1,525
—	7	—	6	1	5	—	12	7	12	1	8	15	63	78
15	28	3	2	5	14	15	11	21	28	6	4	132	121	253
14	18	6	2	11	27	29	12	32	54	16	34	193	186	379
495	5,451	327	1,842	929	2,707	1,230	2,049	1,591	4,639	1,280	14,146	12,755	43,253	56,008
13	253	30	320	17	139	17	90	204	391	17	106	446	1,684	2,130
224	898	340	603	184	307	457	401	344	464	49	124	3,798	3,918	7,716
246	670	223	490	405	714	634	704	508	1,065	163	507	5,198	6,175	11,373
493	5,471	338	1,848	945	2,746	1,252	2,088	1,667	4,585	1,290	14,443	12,836	43,431	56,267
13	255	29	322	18	142	17	102	197	376	18	114	440	1,693	2,133
235	910	342	603	186	314	471	411	326	459	55	128	3,821	3,943	7,764
254	687	228	491	407	731	657	708	500	1,017	179	536	5,242	6,186	11,428
2	44	6	29	18	42	14	23	89	379	4	64	320	946	1,266
—	5	1	4	—	2	—	—	14	27	—	—	21	54	75
4	16	1	2	3	7	1	1	39	33	—	—	109	96	205
6	1	1	1	9	10	6	8	40	102	—	5	149	175	324
—	—	—	1	—	1	2	13	—	—	—	—	10	23	33
—	—	—	—	—	—	14	34	—	—	—	—	25	41	66
—	—	—	—	—	—	—	—	—	—	—	—	—	3	3
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
558	5,985	752	3,373	1,073	3,260	2,925	4,588	2,040	7,575	1,954	24,769	23,912	74,623	98,535
14	323	76	488	26	162	24	198	294	604	51	288	764	2,745	3,509
268	994	446	632	257	476	948	833	514	658	87	291	6,819	5,960	12,779
288	772	327	522	467	872	1,093	1,205	837	1,495	301	844	9,564	9,388	18,952
169	2,332	27	8	66	498	361	1,278	185	1,163	340	6,024	2,297	13,372	15,669
3	48	—	1	1	29	6	13	6	21	—	17	35	153	188
152	693	11	—	21	125	90	57	124	163	46	132	894	1,289	2,183
60	364	2	1	30	239	122	83	214	391	33	352	809	1,570	2,379
*	*	268	96	64	10	277	359	233	146	68	30	2,140	1,189	3,329
*	*	40	27	13	14	—	17	53	62	—	2	128	150	278
*	*	77	17	65	11	81	51	139	42	—	—	1,207	330	1,537
*	*	115	29	114	18	61	36	243	69	130	28	1,920	589	2,509
—	—	—	1	—	—	—	—	—	—	—	—	4	2	6
—	—	—	—	1	—	—	1	—	—	—	—	12	7	19
123	939	30	916	46	147	387	765	103	561	66	1,640	3,057	7,650	10,707
76	492	121	913	26	54	147	139	72	127	—	120	1,096	2,231	3,327

RECORD OF

		Banes Division		Colombia Division		Costa Rica Division	
		W.	C.	W.	C.	W.	C.
Number of treatments administered	Emp. { M.	212	136	1,452	16,262	4,777	2,870
	F.	8	7	24	332	98	32
	Non-emp. { M.	38	10	22	113	11	17
	F.	96	21	116	287	34	32
Number of surgical treatments		307		1,875		517	
Number of medical treatments		221		16,733		7,354	
Total number of treatments		528		18,608		7,871	
Patients sent to hospital.	Emp. { M.	33	329	299	1,883	716	274
	F.	5	3	14	40	32	23
Visits to lodgings	Emp. { M.	234		-		275	
	F.	142		-		39	
Died	Emp. { M.	-	-	1	1	1	2
	F.	-	-	-	-	-	-
	Non-emp. { M.	-	-	-	-	-	-
	F.	-	-	-	-	1	-

*Visits to lodgings made daily.

FIELD DISPENSARIES

Guatemala Division		Jamaica Division		Panama Division		Preston Division		Tela Railroad		Truxillo Railroad		Total		Grand Total
W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	
495 11,581		422 10,985		530 8,071		381 1,429		510 12,740		514 8,710		9,293 72,784		82,077
2 101		- 4,857		2 256		- 11		- 112		12 70		146 5,778		5,924
42 737		10 1,496		5 40		32 53		- 22		1 7		161 2,495		2,656
3 85		40 1,747		14 222		83 132		1 81		5 114		392 2,721		3,113
4,186		4,990		1,719		1,116		4,301		1,465		20,476		
8,860		14,567		7,421		1,005		9,165		7,968		73,294		
13,046		19,557		9,140		2,121		13,466		9,433		93,770		
2 1,523		- 107		85 1,592		1 7		3 975		3 484		1,142 7,174		8,316
- 36		- 25		27 293		- -		2 51		1 23		81 494		575
- *		1,115 713		274 85		19 -		267 23		1,140 103		3,324 1,105		
- -		- 12		- -		- 3		- -		- 8		2 26		28
- -		- 4		- -		- -		- -		- -		- 4		4
- -		- 2		- -		- 2		- -		- -		- 4		4
- -		- 11		- -		- 1		- -		- -		1 12		13

DEATHS BY AGE,

		Banes Division				Colombia Division				Costa Rica Division				Guatemala Division			
		Emp.		Non-Emp.		Emp.		Non-Emp.		Emp.		Non-Emp.		Emp.		Non-Emp.	
		W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.
Under 1 year	M.			3	1							2	2				1
	F.			1	2								1				
1 to 5 years	M.			2													4
	F.			1	2							1					1
6 to 10 years	M.			2									1				
	F.												1				2
11 to 20 years	M.	1	4	1			7			5		5			6		4
	F.			3													5
21 to 30 years	M.	3	25			4	35		1	23	9	13	1		28		4
	F.			1	2							3	3				9
31 to 40 years	M.	4	6	1	2	2	28	3		8	13	3	7		12		8
	F.				1			1				6	2				2
41 to 50 years	M.	3	7	2		1	16		1	6	10	3	4		9	1	2
	F.										1	3	1				
51 to 60 years	M.	3	3	2		3	4			4	6	3	3		3		
	F.			1								1	3				
61 to 70 years	M.	1	1			1				1	5		3		1		
	F.												1				
Over 70 years	M.										1	1	1				
	F.																
Unknown	M.																1
	F.																
TOTAL	M.	15	46	13	3	11	90	3	2	47	44	30	22		59	1	24
	F.			7	7			1			1	14	12				19
GRAND TOTAL		15	46	20	10	11	90	4	2	47	45	44	34		59	1	43

COLOR AND SEX

Jamaica Division				Panama Division				Preston Division				Tela Railroad				Truxillo Railroad				Total		Grand Total
Emp.		Non-Emp.		Emp.		Non-Emp.		Emp.		Non-Emp.		Emp.		Non-Emp.								
W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.			
-	-	-	-	-	-	-	-	7	16	-	-	1	7	-	-	-	5	13	32	45		
-	-	-	6	-	-	-	2	5	9	-	-	-	4	-	-	-	-	6	24	30		
-	-	-	1	-	-	-	1	1	5	-	-	-	-	-	-	-	2	3	13	16		
-	-	-	4	-	-	-	2	2	5	-	-	-	2	-	-	-	2	4	18	22		
-	-	-	1	-	-	-	-	2	-	-	-	-	-	-	-	-	1	4	3	7		
-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	1	4	5		
-	2	-	-	-	-	-	2	-	13	-	1	-	9	-	1	-	24	12	74	86		
-	1	-	-	-	-	-	1	-	2	-	2	-	1	6	-	4	4	19	23			
-	1	-	-	-	10	-	1	2	61	1	-	-	28	-	5	-	73	49	289	338		
-	2	-	1	-	-	-	4	3	2	-	-	-	9	-	9	-	7	7	39	46		
-	4	-	-	1	22	-	1	3	18	2	1	-	11	-	1	2	37	30	172	202		
-	1	-	-	-	-	-	1	3	6	-	-	-	4	-	4	-	7	10	24	34		
-	3	-	-	-	10	1	3	2	9	2	-	-	4	-	-	-	11	23	89	112		
-	-	-	-	-	1	-	1	-	-	2	-	-	1	-	1	-	2	3	9	12		
-	1	-	-	-	7	1	1	1	1	-	-	-	3	-	-	1	4	18	37	55		
-	-	-	-	-	-	-	1	2	1	-	-	-	1	-	-	-	-	5	5	10		
-	1	-	-	-	4	-	1	1	-	-	-	-	1	1	-	1	-	5	18	23		
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1		
-	1	-	-	-	-	-	1	-	1	-	-	-	-	-	-	1	1	3	6	9		
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
-	-	-	-	-	-	-	-	4	-	-	-	-	-	1	-	1	-	-	7	7		
-	-	-	-	-	-	-	-	-	1	-	-	-	-	2	-	-	-	-	3	3		
-	13	-	2	1	53	2	11	9	106	16	24	2	55	2	16	3	151	5	19	160	740	900
-	4	-	11	-	1	-	13	-	-	16	28	-	-	2	28	-	-	-	22	40	146	186
-	17	-	13	1	54	2	24	9	106	32	52	2	55	4	44	3	151	5	41	200	886	1,086



Upper View: Protestant Church, Truxillo Railroad Division
Lower View: Catholic Church, Tela Railroad Division

DEATHS, BY NATIVITY

NATIVITY:	Banes Div.	Colom- bia Div.	Costa Rica Div.	Guate- mala Div.	Ja- maica Div.	Pan- ama Div.	Pres- ton Div.	Tela Rail- road	Trux- illo R.R.	Total
Arabia	—	—	—	—	—	—	1	—	—	1
Argentina	—	—	—	—	—	1	—	—	—	1
Barbadoes	—	—	3	—	1	2	—	—	—	6
British Guiana	—	—	1	—	—	—	—	—	—	1
British Honduras	—	—	—	3	—	—	—	—	2	5
British West Indies (other than Jamaica and Barbadoes)	3	—	4	—	—	4	3	2	—	16
Canada	—	—	1	—	—	—	—	—	—	1
Canary Islands	1	—	—	—	—	—	—	—	—	1
China	3	—	2	—	—	3	4	—	—	12
Colombia	—	102	2	—	—	5	—	—	—	109
Costa Rica	—	—	73	—	—	7	—	1	10	91
Cuba	42	—	1	—	—	—	55	—	1	99
Dutch West Indies	—	2	—	—	—	—	—	—	—	2
England	—	1	—	—	—	1	—	—	1	3
France	—	1	—	—	—	1	1	—	—	3
French West Indies	—	—	1	—	—	2	1	—	—	4
Germany	—	—	1	1	—	1	—	—	—	3
Guatemala	—	—	—	70	—	—	—	2	—	72
Hayti	26	—	—	—	—	1	73	—	—	100
Honduras	—	—	—	9	—	—	—	69	124	202
India	—	—	—	—	4	—	2	—	1	7
Jamaica	12	—	65	12	25	38	44	7	14	217
Nicaragua	—	—	10	—	—	6	—	3	29	48
Norway	—	—	—	—	—	—	1	—	—	1
Panama	—	—	2	—	—	9	—	—	—	11
Porto Rico	1	—	—	—	—	—	—	—	—	1
Salvador	—	—	—	6	—	—	—	16	14	36
Scotland	—	—	1	—	—	—	—	1	—	2
Spain	3	1	2	1	—	—	8	—	1	16
Sweden	—	—	—	—	—	—	1	—	—	1
United States	—	—	—	—	—	—	5	1	2	8
Unknown	—	—	—	1	—	—	—	3	1	5
Venezuela	—	—	1	—	—	—	—	—	—	1
TOTAL	91	107	170	103	30	81	199	105	200	1,086

DEATHS BY

	Banes Division				Colombia Division				Costa Rica Division			
	Emp.		Non-Emp.		Emp.		Non-Emp.		Emp.		Non-Emp.	
	W. C.	C.	W. C.	C.	W. C.	C.	W. C.	C.	W. C.	C.	W. C.	C.
ENDEMIC OR INFECTIOUS DISEASES:												
Typhoid fever (abdominal typhoid and paratyphoid):												
Typhoid fever	1	-	1	1	-	2	-	-	-	-	-	-
Paratyphoid	-	-	-	-	-	2	-	-	-	-	-	-
Malarial fever and cachexia:												
Estivo-autumnal	-	3	4	-	-	3	-	-	4	1	4	-
Tertian	1	1	-	-	-	1	-	-	-	-	2	-
Mixed	-	-	-	-	-	-	-	-	-	-	-	-
Clinical	-	-	-	-	-	-	-	-	-	-	-	-
Cachexia	-	-	-	-	1	1	-	-	5	1	4	2
Hemoglobinuric fever	1	-	-	-	-	-	-	-	2	1	2	-
Whooping cough	-	-	-	1	-	-	-	-	-	-	-	-
Influenza:												
Complications:												
Pneumonia	-	-	-	-	1	-	-	-	1	-	1	1
Others	-	-	-	-	-	-	-	-	-	-	-	-
Cholera nostras (choleraform enteritis)	-	-	-	-	-	-	-	-	2	-	-	1
Dysentery:												
Amebic	-	-	-	-	-	3	-	-	-	-	-	-
Bacillary	-	1	-	-	-	-	-	-	-	-	-	-
Unspecified or due to other causes	-	-	-	-	-	-	-	-	3	-	-	3
Erysipelas	-	-	-	-	-	1	-	-	-	-	-	-
Purulent or septicemic infection	-	1	-	-	1	2	-	-	3	-	-	-
Tetanus	-	-	-	-	-	-	-	-	-	-	3	1
Tuberculosis of the respiratory system:												
Acute pulmonary tuberculosis	4	14	-	-	-	2	-	-	3	8	6	2
Other forms of tuberculosis of respiratory organs	-	-	-	-	-	-	-	-	-	-	-	-
Tuberculosis of the meninges or of the central nervous system	-	1	-	-	-	-	-	-	-	-	-	-
Tuberculosis of the intestines or peritoneum	-	-	-	-	-	-	-	-	1	1	-	1
Tuberculosis of the vertebral column	-	-	-	-	-	-	-	-	-	-	-	-
Tuberculosis of other organs and structures:												
Tuberculosis of other organs	-	-	-	-	-	-	-	-	-	-	-	-
Syphilis (includes syphilitic infection of any organ, tissue or structure of the body):												
Secondary	-	1	-	-	-	-	-	-	-	-	-	-
Tertiary	-	2	-	-	-	-	-	-	2	-	-	-
Hereditary	-	-	-	-	-	-	-	-	-	-	-	1
Period not specified	-	-	-	-	-	1	-	-	-	-	-	-
Gonococcal infection except that of the eye or adnexa	-	-	-	-	-	-	-	-	-	-	1	-
GENERAL DISEASES NOT INCLUDED ABOVE:												
Cancer or other malignant tumors of the buccal cavity:												
Cancer of the tongue	-	-	-	-	-	-	-	-	-	-	-	1
Cancer of the jaw	-	-	-	-	-	-	-	-	-	-	-	-
Cancer or other malignant tumors of the stomach and liver:												
Cancer of the pharynx	-	-	-	-	-	-	-	-	-	1	-	-
Cancer of the stomach	-	-	-	-	-	-	-	-	1	1	1	-
Cancer of the liver and gall bladder	-	-	-	-	-	-	-	-	-	1	-	-
Cancer or other malignant tumors of the peritoneum, intestines and rectum:												
Cancer of the mesentery and peritoneum	-	-	-	-	-	-	-	-	-	-	-	-
Cancer or other malignant tumors of other or unspecified organs:												
Cancer of the pancreas	-	-	-	-	1	-	-	-	-	-	-	-
Cancer of the prostate	-	-	-	-	1	-	-	-	-	-	-	-
Cancer of the bladder	-	-	-	-	-	-	-	-	-	-	-	-
Cancer of the bones except jaw	-	-	-	-	-	1	-	-	-	-	-	-
Others	-	-	-	-	-	-	-	-	-	-	-	-
Acute febrile articular rheumatism	-	-	-	-	-	-	-	-	-	-	-	-
Pellagra	-	-	-	-	-	-	-	-	-	-	-	-
Beri beri	1	2	-	-	-	2	-	-	-	-	-	-
Diabetes	-	-	-	-	-	1	-	1	-	-	-	-
Anemia, Chlorosis:												
Pernicious anemia	-	-	-	-	-	-	-	-	-	-	-	-
Other anemias and chlorosis	-	-	-	-	-	-	-	-	4	1	-	-

DISEASE

Guatemala Division				Jamaica Division				Panama Division				Preston Division				Tela Railroad				Truxillo Railroad				Total
Emp.		Non-Emp.		Emp.		Non-Emp.		Emp.		Non-Emp.		Emp.		Non-Emp.		Emp.		Non-Emp.		Emp.		Non-Emp.		
W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	
-	-	-	-	-	2	-	-	-	-	-	-	-	1	-	-	-	1	-	-	-	-	-	-	9
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
-	6	-	7	-	-	-	-	-	1	-	2	-	4	-	1	1	2	1	5	-	10	-	4	63
-	2	-	2	-	-	-	-	-	1	-	-	-	1	1	1	-	2	-	-	-	1	-	-	16
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-	1	-	-	3
-	5	-	1	-	4	-	8	-	-	-	-	1	2	1	5	-	-	-	-	-	2	-	-	29
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-	-	16
-	2	-	-	-	-	-	-	-	3	-	1	2	-	-	-	-	1	-	1	-	2	-	-	18
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3
-	-	-	-	-	-	-	-	-	-	-	1	-	2	-	-	-	-	-	1	-	-	-	-	7
-	-	-	-	-	-	-	-	-	-	-	-	-	6	2	1	-	-	-	-	3	35	3	13	64
-	1	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1	-	3	-	-	-	-	12
-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	2
-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	3	-	2	-	10	-	1	25
-	1	-	-	-	-	-	-	-	2	-	-	-	-	1	-	-	2	-	2	-	2	-	-	14
-	2	-	1	-	1	-	-	-	3	-	-	-	20	1	4	-	2	-	1	-	7	-	-	81
-	2	-	3	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	1	-	-	7
-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	1	-	-	7
-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	1
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	1
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
-	4	-	-	-	1	-	-	-	-	-	-	-	2	-	-	-	1	-	-	-	-	-	1	13
-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2	-	-	-	-	-	-	-	-	4
-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1	1	1	-	-	-	-	5
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-</						

	DEATHS BY					
	Banes Division		Colombia Division		Costa Rica Division	
	Emp. Non-Emp.		Emp. Non-Emp.		Emp. Non-Emp.	
	W. C.	W. C.	W. C.	W. C.	W. C.	W. C.
GENERAL DISEASES NOT INCLUDED ABOVE — Continued						
Alcoholism (acute or chronic)	—	—	—	—	—	—
Chronic poisoning by organic substances	—	—	—	—	1	—
Other general diseases:						
Auto-intoxications	—	1	—	—	—	—
Others	—	—	—	—	—	—
DISEASES OF THE NERVOUS SYSTEM AND ORGANS OF SPECIAL SENSE:						
Encephalitis.	—	—	—	—	—	—
Meningitis:						
Simple	—	—	—	—	—	—
Non-epidemic cerebrospinal meningitis	—	—	—	—	—	—
Other diseases of the spinal cord:						
Others	—	—	—	—	—	—
Cerebral hemorrhage, apoplexy:						
Cerebral hemorrhage.	1	—	—	3	—	—
Cerebral thrombosis and embolism.	—	1	—	—	—	—
Paralysis (without specified cause):						
Hemiplegia	—	—	—	—	—	—
General paralysis (of the insane).	—	—	—	—	—	1
Other forms of mental alienation.	—	—	—	—	—	—
Epilepsy	—	1	—	—	—	—
Diseases of the organs of hearing and of the mastoid process:						
Diseases of the mastoid process	—	—	—	—	—	—
DISEASES OF THE CIRCULATORY SYSTEM:						
Pericarditis	—	—	—	1	—	—
Acute endocarditis and myocarditis:						
Acute endocarditis.	—	—	—	1	—	—
Acute myocarditis	—	—	—	3	—	—
Angina pectoris	—	—	—	—	1	—
Other diseases of the heart:						
Chronic endocarditis.	—	1	—	1	—	—
Chronic myocarditis	—	1	—	2	1	—
Other chronic diseases of the heart.	—	1	—	—	—	—
Aneurism.	—	—	—	—	1	—
Atheroma and other diseases of the arteries.	—	—	—	—	—	—
Embolism and thrombosis (except cerebral).	—	—	—	—	—	—
Hemorrhage without determined cause; other diseases of the circulatory system.	—	—	—	—	1	—
DISEASES OF THE RESPIRATORY SYSTEM:						
Diseases of the larynx (except tuberculosis and cancer).	—	—	—	—	—	—
Broncho-pneumonia (including capillary bronchitis):						
Broncho-pneumonia	—	13	—	17	—	—
Pneumonia:						
Lobar	1	1	—	1	20	1
Not otherwise specified.	—	—	—	1	—	—
Pleurisy:						
Empyema of thoracic cavity	—	—	—	—	—	—
Gangrene of the lung.	—	—	—	—	1	1
Other diseases of the respiratory system (tuberculosis excepted):						
Others	—	—	—	—	—	1
DISEASES OF THE DIGESTIVE SYSTEM:						
Diseases of the pharynx and tonsils (including adenoids):						
Tonsilitis.	1	—	—	—	—	—
Ulcer of the stomach and duodenum:						
Ulcer of the stomach.	—	—	—	—	—	—
Other diseases of the stomach (cancer excepted):						
Stricture or stenosis of pylorus.	—	—	—	—	—	—
Diarrhea and enteritis (under 2 years of age)	—	3	—	—	—	—
Diarrhea and enteritis (2 years and over).	—	1	1	—	—	—
Ankylostomiasis.	—	—	—	—	—	—
Appendicitis and typhlitis.	—	—	—	—	—	—

DISEASE—Continued

Guatemala Division				Jamaica Division				Panama Division				Preston Division				Tela Railroad				Truxillo Railroad				Total
Emp.		Non-Emp.		Emp.		Non-Emp.		Emp.		Non-Emp.		Emp.		Non-Emp.		Emp.		Non-Emp.		Emp.		Non-Emp.		
W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	
-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	2
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	2	-	-	-	-	-	3
-	-	-	2	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	4
-	1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	1	-	2	-	-	-	-	-	6
-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	-	1	-	-	-	-	-	-	-	3
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
-	3	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	8
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
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-	3	-	4	-	-	-	-	-	-	-	-	-	10	-	1	-	1	-	1	-	1	-	2	66
-	10	-	8	-	-	-	-	-	11	-	6	-	34	-	1	-	14	1	3	-	42	-	10	167
-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	7
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	DEATHS BY											
	Banes Division				Colombia Division				Costa Rica Division			
	Emp.		Non-Emp.		Emp.		Non-Emp.		Emp.		Non-Emp.	
	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.
DISEASES OF THE DIGESTIVE SYSTEM:—Continued												
Hernia, intestinal obstruction:												
Hernia	1	—	—	—	—	—	—	—	—	—	—	—
Intestinal obstruction	—	1	—	—	—	1	—	—	1	1	—	—
Other diseases of the intestines:												
Other diseases of the intestines	—	—	1	—	—	—	—	—	—	—	—	—
Hydatid tumor of the liver	1	—	—	—	—	—	—	—	—	—	—	—
Cirrhosis of the liver:												
Returned as alcoholic	—	—	—	—	—	1	—	—	—	—	—	—
Not returned as alcoholic	—	—	1	—	—	—	—	—	—	2	—	—
Other diseases of the liver:												
Abscess of the liver, amebic	—	—	—	—	—	1	—	—	—	—	—	—
Other diseases of the liver	—	1	1	—	—	—	—	—	—	—	—	—
Peritonitis of unstated cause	—	—	—	—	1	1	—	—	—	2	3	1
NON-VENEREAL DISEASES OF THE GENITO-URINARY SYSTEM AND ITS ADNEXA:												
Acute nephritis (including unspecified under ten years of age)	—	—	1	1	1	5	—	—	—	1	—	—
Chronic nephritis (including unspecified over ten years of age)	—	2	—	—	1	5	—	—	1	8	2	4
Other diseases of the kidneys and their adnexa (diseases of the kidney in pregnancy not included)	—	—	—	—	—	—	—	—	—	—	—	—
Diseases of the urethra, urinary abscess, etc.:												
Stricture of the urethra	—	—	—	—	—	—	—	—	—	—	—	—
Others	—	—	—	—	—	—	—	—	—	1	—	—
Salpingitis or pelvic abscess	—	—	—	—	—	—	—	—	—	—	—	—
THE PUERPERAL STATE:												
Accidents of pregnancy:												
Abortion	—	—	—	—	—	—	—	—	—	—	—	—
Other accidents of pregnancy	—	—	—	—	—	—	—	—	—	—	—	—
Puerperal hemorrhage	—	—	—	—	—	—	—	—	—	—	—	—
Puerperal septicemia	—	—	—	—	—	—	—	—	—	—	—	1
Puerperal albuminuria or convulsions	—	—	—	—	—	—	—	—	—	—	—	1
DISEASES OF THE SKIN OR CELLULAR TISSUE:												
Gangrene	—	—	—	—	—	—	—	—	—	1	—	2
Boil, carbuncle, furuncle	—	—	—	—	—	—	—	—	—	—	—	—
Phlegmon, acute abscess	—	—	—	—	—	—	—	—	—	—	1	—
DISEASES OF EARLY INFANCY:												
Congenital debility, icterus and sclerema:												
Marasmus	—	—	—	—	—	—	—	—	—	—	—	—
Premature birth, or consequence of labor:												
Premature birth	—	—	—	—	—	—	—	—	—	—	—	1
Other diseases peculiar to early infancy:												
Others	—	—	—	—	—	—	—	—	—	—	2	2
OLD AGE:												
Old age (senility)	1	—	—	—	—	—	—	—	—	—	—	—
EXTERNAL CAUSES:												
Suicide (state the method)	—	—	—	—	—	—	—	—	—	—	—	—
Poisoning by venomous animals	—	—	—	—	—	—	—	—	1	1	1	—
Other acute poisonings	—	—	—	—	—	—	—	—	—	—	1	—
Burns and scalds	—	—	—	—	—	1	—	—	—	—	—	—
Injury by firearms	—	—	—	—	—	2	—	—	—	—	—	—
Injury by cutting or piercing instruments	1	—	—	—	—	—	—	—	—	—	1	—
Injury by falls	—	—	1	—	—	—	—	—	—	—	—	—
Traumatism by machines	—	—	—	—	—	—	—	—	—	—	—	—
Traumatism by other crushing (vehicles, railways, landslides, etc.)	—	—	1	1	1	—	—	—	—	1	2	2
Lightning	—	—	—	—	—	—	—	1	—	—	—	—
Homicide by firearms	—	—	—	—	—	—	—	—	—	—	—	—
Homicide by cutting or piercing instruments	—	—	—	—	—	—	—	—	—	—	—	—
Fractures (cause not specified)	—	—	—	—	1	1	2	—	1	—	—	—
ILL-DEFINED DISEASES:												
Infections of undetermined origin	—	—	—	—	—	—	—	—	—	—	—	—
TOTALS	15	46	20	10	11	90	4	2	47	45	44	34

DISEASE—Continued

Guatemala Division				Jamaica Division				Panama Division				Preston Division				Tela Railroad				Truxillo Railroad				Total
Emp.		Non-Emp.		Emp.		Non-Emp.		Emp.		Non-Emp.		Emp.		Non-Emp.		Emp.		Non-Emp.		Emp.		Non-Emp.		
W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	
-	-	-	-	-	-	-	-	-	1	-	-	-	-	1	-	-	-	-	-	-	-	-	6	
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-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	2	
-	-	-	-	2	-	1	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1	13	
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-	1	-	-	-	1	-	-	-	11	-	2	-	5	-	2	-	-	-	-	2	-	-	11	
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-	1	-	-	-	2	-	-	-	-	-	1	2	-	-	-	-	-	-	-	-	-	-	5	
-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	2	-	5	-	1	8	
-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	2	-	2	-	7	-	12	
-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	2	-	-	-	14	
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-	2	-	1	-	-	-	-	-	1	-	-	1	2	-	1	-	1	-	1	-	-	-	18	
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-	1	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	1	-	2	-	-	-	7	
-	2	-	-	-	1	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	4	
-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	1	-	-	-	1	-	9	
-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	2	-	-	-	-	-	4	
-	59	1	43	-	17	-	13	1	54	2	24	9	106	32	52	2	55	4	44	3	151	5	41	1,086

REPATRIATIONS

Jamaica Division				Panama Division				Preston Division				Tela Railroad				Truxillo Railroad				Grand Total
Emp.		Non-Emp.		Emp.		Non-Emp.		Emp.		Non-Emp.		Emp.		Non-Emp.		Total				
M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.			
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-	-	-	-	4	-	1	-	4	-	-	-	8	-	-	1	26	1			
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-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	1	-			

RECORD OF

		Banes Division				Colombia Division				Costa Rica Division				Guatemala Division			
		Emp.		Non- Emp.		Emp.		Non- Emp.		Emp.		Non- Emp.		Emp.		Non- Emp.	
		M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
Pneumonia, lobar.	{W. C.	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
Empyema of thoracic cavity . . .	{W. C.	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
Ankylostomiasis	{W. C.	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
Hernia	{W. C.	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
Cirrhosis of the liver, alcoholic . . .	{W. C.	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-
Acute nephritis.	{W. C.	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
Chronic nephritis	{W. C.	-	-	-	-	6	-	-	-	-	-	-	-	-	-	-	-
Scabies	{W. C.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ulcer of the skin	{W. C.	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
Old age	{W. C.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Injury by cutting or piercing instru- ments	{W. C.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fractures	{W. C.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other external violence	{W. C.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL		5	-	-	-	47	2	-	-	1	-	-	-	-	-	-	-

REPATRIATIONS—Continued

Jamaica Division				Panama Division				Preston Division				Tela Railroad				Truxillo Railroad				Total		Grand Total
Emp.		Non-Emp.		Emp.		Non-Emp.		Emp.		Non-Emp.		Emp.		Non-Emp.								
M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.			
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-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						

TREATED IN HOSPITALS

[illegible]

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	Deaths in Hospitals	Grand Total
1906-7	18,000	20,000
1907-8	18,000	20,000
1908-9	18,000	20,000
1909-10	18,000	20,000
1910-11	18,000	20,000
1911-12	18,000	20,000
1912-13	18,000	20,000
1913-14	18,000	20,000
1914-15	18,000	20,000
1915-16	18,000	20,000
1916-17	18,000	20,000
1917-18	18,000	20,000
1918-19	18,000	20,000
1919-20	18,000	20,000
1920-21	18,000	20,000
1921-22	18,000	20,000
1922-23	18,000	20,000
1923-24	18,000	20,000
1924-25	18,000	20,000
1925-26	18,000	20,000
1926-27	18,000	20,000
1927-28	18,000	20,000
1928-29	18,000	20,000
1929-30	18,000	20,000
1930-31	18,000	20,000
1931-32	18,000	20,000
1932-33	18,000	20,000
1933-34	18,000	20,000
1934-35	18,000	20,000
1935-36	18,000	20,000
1936-37	18,000	20,000
1937-38	18,000	20,000
1938-39	18,000	20,000
1939-40	18,000	20,000
1940-41	18,000	20,000
1941-42	18,000	20,000
1942-43	18,000	20,000
1943-44	18,000	20,000
1944-45	18,000	20,000
1945-46	18,000	20,000
1946-47	18,000	20,000
1947-48	18,000	20,000
1948-49	18,000	20,000
1949-50	18,000	20,000
1950-51	18,000	20,000
1951-52	18,000	20,000
1952-53	18,000	20,000
1953-54	18,000	20,000
1954-55	18,000	20,000
1955-56	18,000	20,000
1956-57	18,000	20,000
1957-58	18,000	20,000
1958-59	18,000	20,000
1959-60	18,000	20,000
1960-61	18,000	20,000
1961-62	18,000	20,000
1962-63	18,000	20,000
1963-64	18,000	20,000
1964-65	18,000	20,000
1965-66	18,000	20,000
1966-67	18,000	20,000
1967-68	18,000	20,000
1968-69	18,000	20,000
1969-70	18,000	20,000
1970-71	18,000	20,000
1971-72	18,000	20,000
1972-73	18,000	20,000
1973-74	18,000	20,000
1974-75	18,000	20,000
1975-76	18,000	20,000
1976-77	18,000	20,000
1977-78	18,000	20,000
1978-79	18,000	20,000
1979-80	18,000	20,000
1980-81	18,000	20,000
1981-82	18,000	20,000
1982-83	18,000	20,000
1983-84	18,000	20,000
1984-85	18,000	20,000
1985-86	18,000	20,000
1986-87	18,000	20,000
1987-88	18,000	20,000
1988-89	18,000	20,000
1989-90	18,000	20,000
1990-91	18,000	20,000
1991-92	18,000	20,000
1992-93	18,000	20,000
1993-94	18,000	20,000
1994-95	18,000	20,000
1995-96	18,000	20,000
1996-97	18,000	20,000
1997-98	18,000	20,000
1998-99	18,000	20,000
1999-00	18,000	20,000
2000-01	18,000	20,000
2001-02	18,000	20,000
2002-03	18,000	20,000
2003-04	18,000	20,000
2004-05	18,000	20,000
2005-06	18,000	20,000
2006-07	18,000	20,000
2007-08	1	

[illegible]

CLASSIFICATION OF DISEASES

	Banes Division		Colombia Division		Costa Rica Division		Guatemala Division	
	Emp. Non-Emp.		Emp. Non-Emp.		Emp. Non-Emp.		Emp. Non-Emp.	
	W. C.	W. C.	W. C.	W. C.	W. C.	W. C.	W. C.	W. C.
General Diseases Not Included Above:								
—Continued								
Others	-	-	-	-	-	-	-	-
Cancer or other malignant tumors of the breast	-	-	-	-	1	1	-	-
Cancer or other malignant tumors of the skin	-	-	-	-	-	-	1	-
Cancer or other malignant tumors of other or unspecified organs:								
Cancer of the larynx	-	-	-	-	-	1	-	-
Cancer of the lung and pleura	-	-	-	-	-	1	-	-
Cancer of the pancreas	-	-	1	-	-	-	-	-
Cancer of the kidneys and suprarenals	-	-	-	-	-	-	-	-
Cancer of the prostate	-	-	1	-	-	-	-	-
Cancer of the bladder	-	-	-	-	-	-	-	-
Cancer of the brain	-	-	-	-	-	-	-	-
Cancer of the bones (except jaw)	-	-	-	1	-	-	-	1
Cancer of the testes	-	-	-	-	-	-	-	-
Others	-	-	-	1	-	2	-	1
Benign tumors and tumors not returned as malignant (except benign or non-specified tumors of the ovary and uterus):								
Tumor of brain	-	-	-	-	-	-	-	-
Tumor of thorax	1	-	-	-	-	-	-	-
Tumor of abdomen	-	-	-	-	-	-	-	-
Tumor of bladder	-	-	-	-	-	-	-	-
Tumor of prostate	-	-	-	-	-	-	-	-
Tumor of other location	-	1	-	-	-	1	1	-
Acute febrile articular rheumatism	5	14	-	-	3	14	-	-
Chronic rheumatism or gout:								
Chronic rheumatism	2	3	-	-	6	18	-	-
Chronic gout	-	-	-	-	-	-	-	-
Scurvy	-	-	-	-	-	-	-	-
Pellagra	-	-	-	-	-	-	-	-
Beri beri	1	5	-	-	6	19	-	-
Rickets	-	-	-	-	-	-	-	-
Diabetes	-	1	-	-	-	2	-	-
Anemia, Chlorosis:								
Pernicious anemia	-	1	1	-	-	3	1	-
Other anemias and chlorosis	1	1	1	-	1	1	12	1
Diseases of the pituitary gland	-	-	-	-	-	-	-	-
Diseases of the thyroid gland:								
Exophthalmic goitre	-	-	-	-	-	-	-	-
Other diseases of the thyroid gland	-	2	-	-	-	-	-	-
Diseases of the parathyroid glands	-	-	-	-	-	-	-	-
Diseases of the thymus	-	-	-	-	-	-	-	-
Addison's disease (disease of the adrenals)	-	-	-	-	1	-	-	1
Disease of the spleen	-	-	-	2	7	-	23	1
Leukemia and Hodgkin's disease:								
Leukemia	-	-	-	-	-	-	-	-
Hodgkin's disease	-	-	-	-	-	-	-	-
Alcoholism (acute or chronic)	-	-	-	-	-	2	-	4
Chronic poisoning by mineral substances	-	-	-	-	-	-	-	5
Chronic poisoning by organic substances	-	-	-	-	-	-	-	3
Other general diseases:								
(a) Acidosis	-	-	-	-	-	-	-	-
(b) Amyloid degenerations	-	-	-	-	-	-	-	-
(c) Autointoxications	1	2	-	1	-	-	-	-
(d) Hemophilia	-	-	-	-	-	-	-	-
(e) Purpura hemorrhagica	-	-	-	-	-	-	-	-
(f) Others	-	-	-	-	-	-	-	-

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[illegible]

CLASSIFICATION OF DISEASES

	Banes Division				Colombia Division				Costa Rica Division				Guatemala Division			
	Emp.		Non-Emp.		Emp.		Non-Emp.		Emp.		Non-Emp.		Emp.		Non-Emp.	
	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.
Diseases of the Nervous System and Organs of Special Sense:																
Encephalitis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
Meningitis:																
Simple	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	2
Non-epidemic cerebrospinal meningitis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Progressive locomotor ataxia (tabes dorsalis)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other diseases of the spinal cord:																
Bulbar paralysis (Duchenne's disease)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Paralysis agitans (Parkinson's disease)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acute ascending spinal paralysis (Landry's disease)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Myelitis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Others	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cerebral hemorrhage, apoplexy:																
Cerebral hemorrhage	-	-	-	-	-	1	-	-	-	-	-	-	-	3	-	-
Cerebral thrombosis and embolism	-	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-
Paralysis (without specified cause):																
Hemiplegia	-	-	-	-	-	-	-	-	3	2	2	1	-	-	-	-
Other forms of paralysis	-	-	-	-	-	-	-	-	-	-	-	1	-	1	2	-
General paralysis (of the insane)	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-
Other forms of mental alienation	-	-	-	-	-	2	-	-	-	-	-	1	-	2	-	-
Epilepsy	-	-	-	-	-	3	-	-	1	-	-	-	-	2	1	-
Convulsions (non puerperal, 5 years and over)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Infantile convulsions (under 5 years of age)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chorea:																
Chorea	-	-	-	-	-	-	-	-	1	2	2	1	-	-	-	-
Hysteria and neuralgia	-	1	-	-	-	4	1	1	4	1	2	-	-	1	-	-
Neuritis	1	1	-	-	2	7	-	-	-	-	-	-	-	-	-	-
Softening of the brain	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-
Other diseases of the nervous system	-	-	-	-	1	3	-	-	-	-	-	-	-	2	1	-
Diseases of the organs of vision and adnexa (except gonococcal infection):																
Diseases of the eye (except tumor)	1	2	-	-	-	-	-	2	-	-	-	-	-	3	1	1
Follicular conjunctivitis	1	3	-	-	4	12	-	-	-	-	-	-	-	6	-	3
Trachoma	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
Tumors of the eye	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
Other diseases of the eye or its adnexa	-	1	-	-	8	34	-	2	4	6	1	-	-	2	-	-
Diseases of the organs of hearing and the mastoid process:																
Diseases of the ear	-	-	-	-	3	7	2	-	14	6	2	4	-	8	-	1
Diseases of the mastoid process	2	-	-	-	-	-	-	-	1	1	-	1	-	1	1	-
Diseases of the Circulatory System:																
Pericarditis	-	-	-	-	-	1	-	-	-	1	-	-	-	1	-	-
Acute endocarditis and myocarditis:																
Acute endocarditis	-	-	1	-	-	3	-	-	-	3	1	-	-	-	-	-
Acute myocarditis	-	-	-	-	-	-	-	-	1	5	-	1	-	-	-	-
Angina pectoris	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
Other diseases of the heart:																
Chronic endocarditis	2	-	2	-	-	4	-	-	-	1	-	1	-	6	1	2
Chronic myocarditis	-	-	-	-	-	2	1	-	-	-	-	-	-	-	-	-
Other chronic diseases of the heart	-	-	1	-	-	2	-	1	4	8	4	8	-	3	-	2
Aneurism	-	1	-	-	-	-	-	-	-	3	-	-	-	-	-	-
Atheroma and other diseases of the arteries	-	-	-	-	-	-	-	-	1	7	1	-	-	1	1	-
Embolism and thrombosis (except cerebral)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Diseases of the veins (varices, hemorrhoids, phlebitis, etc.)	5	3	-	1	2	24	1	1	9	4	1	-	-	1	-	-
Diseases of the lymphatic system (lymphangitis, etc.)	1	-	-	-	4	49	1	-	19	3	1	4	5	18	3	1
Hemorrhage without determined cause; other diseases of the circulatory system	-	-	-	-	-	1	-	-	1	1	-	-	-	2	-	-

TREATED IN HOSPITALS—Continued

Jamaica Division		Panama Division		Preston Division		Tela Railroad		Truxillo Railroad		Total		Grand Total	Deaths in Hospitals
Emp.	Non-Emp.	Emp.	Non-Emp.	Emp.	Non-Emp.	Emp.	Non-Emp.	Emp.	Non-Emp.	Emp.	Non-Emp.		
W. C.	W. C.	W.	C.	W. C.	W. C.	W. C.	W. C.	W. C.	W. C.	Emp.	Non-Emp.		
-	-	-	-	2	-	-	-	-	-	-	4	4	4
-	-	-	-	-	-	-	-	-	-	2	5	7	6
-	-	-	-	1	-	1	-	-	-	3	3	6	3
-	-	-	-	1	1	-	-	-	1	3	1	4	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	2	1	3	1
-	-	-	-	1	-	-	-	-	2	6	1	7	6
-	-	-	-	-	-	-	-	-	-	1	1	2	1
-	-	-	-	2	-	2	-	-	-	7	6	13	1
-	-	-	-	1	-	-	1	-	-	3	2	5	-
-	-	-	-	-	-	-	-	-	2	2	1	3	1
-	-	-	-	3	-	4	-	3	-	14	7	21	1
-	-	-	-	3	-	-	2	-	2	14	4	18	-
-	-	-	-	-	-	-	2	-	1	2	2	4	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	3	4	7	-
-	-	-	-	-	-	-	-	-	1	12	7	19	-
-	-	-	-	-	-	-	-	-	9	21	-	21	-
-	-	-	-	-	-	-	-	-	-	-	1	1	-
-	-	-	-	2	1	3	1	14	7	35	15	50	-
-	-	-	-	3	-	1	-	-	-	-	-	-	-
-	-	-	-	3	-	1	-	-	-	-	-	-	-
-	-	-	-	1	-	-	-	-	-	-	-	-	-
-	-	-	-	2	-	-	-	-	-	3	2	5	-
-	-	-	-	13	-	9	3	7	-	109	13	122	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	10	-	4	1	3	1	109	31	140	-
-	-	-	-	-	1	1	1	1	-	10	8	18	1
-	-	-	-	-	-	-	-	-	-	3	-	3	3
-	-	-	-	-	-	-	-	-	-	9	2	11	4
-	-	-	-	-	-	-	-	-	-	13	1	14	7
-	-	-	-	-	-	-	-	-	-	-	1	1	1
-	-	-	-	17	-	3	-	1	-	32	9	41	5
-	-	-	-	13	-	-	-	1	4	21	3	24	9
-	-	-	-	1	13	-	2	9	2	46	26	72	17
-	-	-	-	2	-	-	-	2	-	9	-	9	2
-	-	-	-	-	-	-	1	-	-	11	4	15	1
-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	2	2	-	2	1
1	1	-	-	14	-	6	1	1	-	68	10	78	-
2	-	1	-	1	-	2	8	41	1	167	14	181	-
-	-	-	-	-	-	-	1	2	16	24	5	29	4

CLASSIFICATION OF DISEASES																
	Banes Division				Colombia Division				Costa Rica Division				Guatemala Division			
	Emp.		Non-Emp.		Emp.		Non-Emp.		Emp.		Non-Emp.		Emp.		Non-Emp.	
	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.
Diseases of the Respiratory System:																
Diseases of the nasal fossae and their adnexa:																
Diseases of the nasal fossae	-	-	-	1	2	2	-	-	2	2	-	2	-	-	-	-
Others	-	-	-	-	-	1	-	-	7	6	1	1	-	-	-	-
Diseases of the larynx (except tuberculosis and cancer)																
-	-	-	1	-	-	2	-	-	-	-	-	-	-	2	1	-
Bronchitis:																
Acute	2	3	2	1	3	17	-	-	24	16	5	1	4	39	2	19
Chronic	-	6	3	-	1	-	-	-	1	-	-	-	-	2	-	-
Not otherwise defined (under 5 years of age)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Not otherwise defined (5 years and over)	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-
Broncho pneumonia (including capillary bronchitis):																
Broncho pneumonia	7	44	8	7	-	27	-	-	6	5	5	1	-	12	2	10
Capillary bronchitis	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pneumonia:																
Lobar	3	1	4	-	3	79	1	-	3	4	2	1	-	27	-	16
Not otherwise specified	-	-	-	-	-	16	-	-	1	1	4	-	1	9	-	4
Pleurisy:																
Pleurisy	-	2	-	-	-	1	-	-	7	3	3	-	-	7	-	-
Empyema of thoracic cavity	-	1	1	-	-	1	-	-	-	-	-	-	-	1	-	2
Congestion or parenchymatous hemorrhage of the lung																
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gangrene of the lung																
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Asthma																
4	1	-	-	2	5	-	-	2	2	5	4	-	1	-	2	-
Emphysema of the lung																
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other diseases of the respiratory system (tuberculosis excepted):																
Chronic interstitial pneumonia (including occupational diseases of the lung)																
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Diseases of the mediastinum																
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Others																
-	-	-	-	-	-	-	-	-	1	-	-	1	-	-	-	-
Diseases of the Digestive System:																
Diseases of the mouth and adnexa:																
Diseases of the teeth and gums																
-	5	-	-	-	12	-	-	22	9	2	5	-	8	-	1	-
Other diseases of the buccal cavity and adnexa																
1	-	-	-	1	3	-	-	2	2	-	-	-	1	-	1	-
Diseases of the pharynx and tonsils (including adenoids):																
Streptococcic sore throat																
-	-	-	-	1	8	-	-	1	1	1	-	-	-	-	-	-
Ludwig's angina																
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tonsillitis																
1	-	-	-	3	7	-	-	5	4	3	5	-	4	2	1	-
Adenoids																
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Others																
-	-	-	-	1	1	-	-	3	-	-	-	-	2	-	-	-
Diseases of the esophagus																
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ulcer of the stomach and duodenum:																
Ulcer of the stomach																
-	-	-	-	1	1	-	-	6	1	-	-	-	-	1	-	-
Ulcer of the duodenum																
-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-
Other diseases of the stomach (cancer excepted):																
Indigestion																
5	35	5	-	6	7	1	-	7	6	2	-	19	21	17	12	-
Gastritis																
1	2	1	-	-	2	-	-	2	1	-	-	2	2	-	2	-
Stricture or stenosis of pylorus																
-	-	-	-	-	1	-	-	-	-	-	-	-	1	-	-	-
Others																
1	1	1	-	-	2	-	-	-	-	-	-	-	1	1	1	-
Diarrhea and enteritis (under 2 years of age)																
-	-	4	1	-	-	-	-	-	-	4	2	-	-	-	-	3
Diarrhea and enteritis (2 years and over)																
6	29	1	1	2	12	-	-	14	2	2	4	-	17	4	11	-
Ankylostomiasis																
6	119	3	-	40	237	3	3	227	32	39	4	1	170	3	92	-
Diseases due to other intestinal parasites:																
Cestodes (hydatids of the liver excepted)																
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trematodes																
-	3	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
Filariasis																
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TREATED IN HOSPITALS—Continued

Jamaica Division				Panama Division				Preston Division				Tela Railroad				Truxillo Railroad				Total		Grand Total	Deaths in Hospitals
Emp.		Non-Emp.		Emp.		Non-Emp.		Emp.		Non-Emp.		Emp.		Non-Emp.		Emp.		Non-Emp.		Emp.	Non-Emp.		
W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.				
-	-	-	-	1	5	-	6	-	-	-	-	-	-	-	9	-	-	-	-	23	9	32	-
-	-	-	-	-	1	1	1	-	1	-	-	-	-	-	-	-	-	-	-	16	5	21	-
1	-	-	-	1	1	-	1	-	2	-	-	-	-	-	4	1	-	-	-	13	5	18	1
-	-	-	-	5	13	1	5	13	8	2	4	1	-	1	1	4	58	3	4	210	51	261	-
-	-	-	-	4	5	-	-	4	3	-	-	-	1	-	-	-	11	-	1	38	4	42	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1	-	
-	-	-	-	-	-	-	-	-	-	-	-	4	16	1	4	-	7	-	-	29	5	34	-
-	-	-	-	-	3	1	1	1	11	3	1	-	5	1	1	-	14	-	3	133	44	177	63
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13	-	2	15	2	17	160
-	-	-	-	-	20	-	10	-	65	1	4	-	36	1	4	-	84	-	13	325	57	382	7
-	-	-	-	-	1	-	-	-	-	-	-	-	6	2	3	-	12	-	-	47	13	60	-
-	-	-	-	1	24	-	2	1	4	1	-	1	10	3	4	-	4	-	1	65	14	79	5
-	-	-	-	-	1	-	-	-	2	-	-	-	-	3	-	-	2	-	-	8	6	14	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	-	1	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-
1	-	-	-	1	3	1	2	-	3	1	1	-	6	2	5	1	3	1	2	35	26	61	-
-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	1	-	1	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	1	-	-	-	-	3	2	5	1
-	-	-	-	-	13	-	4	-	5	-	-	-	3	2	-	5	65	3	3	147	20	167	-
-	-	-	-	-	1	-	2	1	4	-	-	-	3	-	-	-	1	-	-	20	3	23	-
-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	2	-	-	14	1	15	-
1	-	-	-	1	3	6	10	7	9	7	4	3	5	12	2	1	3	-	2	57	54	111	1
-	-	-	-	-	-	-	-	-	1	-	-	-	-	3	-	-	-	-	-	-	3	3	-
-	-	-	-	-	6	-	2	-	-	-	-	-	1	-	-	-	2	-	-	16	2	18	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-	-	1	1	2	-
1	-	-	-	-	1	-	-	2	2	1	1	-	1	1	-	-	-	-	-	16	4	20	1
1	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	-	5	-
-	-	-	-	2	2	1	3	-	1	-	-	2	3	-	-	14	40	-	5	170	46	216	-
-	-	1	-	-	4	-	-	-	-	-	-	-	2	3	4	-	19	-	-	37	11	48	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	2	1
-	-	-	-	-	-	-	-	-	1	-	-	2	16	-	8	-	1	-	-	25	11	36	-
-	-	-	-	-	-	-	1	-	-	4	8	-	-	1	3	-	-	-	-	-	31	31	10
-	-	-	-	3	5	1	1	5	3	1	1	4	14	1	3	8	140	-	12	264	43	307	5
-	-	-	-	1	90	1	20	-	7	-	-	1	100	4	22	7	296	5	23	1 334	222	1,556	3
-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	1	4	-
-	-	-	-	-	-	-	-	-	1	-	-	-	1	-	-	-	-	-	-	2	-	2	-

	CLASSIFICATION OF DISEASES															
	Banes Division				Colombia Division				Costa Rica Division				Guatemala Division			
	Emp.		Non-Emp.		Emp.		Non-Emp.		Emp.		Non-Emp.		Emp.		Non-Emp.	
	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.
Diseases of the Digestive System:																
—Continued																
Ascariasis	—	10	—	—	2	4	1	—	24	5	3	3	—	36	2	23
Trichocephalus	1	26	—	—	2	1	—	—	2	—	1	—	—	1	—	1
Nematodes not specified	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—
Parasites not specified	—	—	—	—	1	3	2	—	15	7	7	9	—	—	3	1
Appendicitis and typhlitis	12	2	9	1	—	6	—	—	5	2	3	2	5	4	5	1
Hernia, intestinal obstruction:																
Hernia	7	11	10	—	8	33	2	2	6	11	3	—	—	4	2	—
Intestinal obstruction	—	2	—	—	—	5	—	—	1	1	—	1	—	1	—	1
Other diseases of the intestines:																
Diseases of the anus and stercoral fistulae	3	2	1	—	3	8	1	—	1	1	—	—	—	2	—	—
Other diseases of the intestines	—	—	—	—	1	3	1	—	20	3	11	3	1	—	1	1
Acute yellow atrophy of the liver	—	—	—	—	—	4	—	—	—	—	1	—	—	—	—	—
Hydatid tumor of the liver	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Cirrhosis of the liver:																
Returned as alcoholic	—	—	—	—	—	3	—	—	—	1	—	—	1	1	—	—
Not returned as alcoholic	—	1	1	—	—	9	—	—	1	1	—	1	—	1	—	1
Biliary calculi	—	—	—	—	—	1	—	—	1	1	—	—	—	—	—	—
Other diseases of the liver:																
Abscess of the liver, amebic	—	—	—	—	—	5	—	—	3	5	2	1	—	—	—	—
Other diseases of the liver	—	—	2	—	3	6	—	—	36	20	8	4	—	2	1	1
Diseases of the pancreas except cancer	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Peritonitis of unstated cause	—	—	—	—	1	1	—	—	—	2	3	2	—	—	—	2
Other diseases of the digestive system (cancer and tuberculosis excepted)	—	—	—	—	—	2	—	—	—	—	—	—	—	—	—	1
Non-Venereal Diseases of the Genito-Urinary System and its Adnexa:																
Acute nephritis (including unspecified under ten years of age)	—	—	—	1	1	16	—	—	2	1	2	1	—	—	—	—
Chronic nephritis (including unspecified over ten years of age)	7	50	—	2	1	32	2	—	20	22	4	7	1	10	1	4
Chyluria	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other diseases of the kidneys and their adnexa (diseases of the kidney in pregnancy not included)	—	—	—	—	3	2	—	—	3	3	3	2	—	—	1	3
Calculi of the urinary passages	—	—	—	—	—	—	—	—	1	—	1	—	—	—	—	1
Diseases of the bladder (except tumors)	—	3	—	—	—	2	1	—	5	3	—	2	—	1	—	1
Diseases of the urethra, urinary abscess, etc.:																
Stricture of the urethra	2	5	—	—	3	13	3	—	1	12	4	—	—	1	1	2
Others	—	—	—	—	—	4	1	1	1	2	—	—	—	2	—	—
Diseases of the prostate (except tumors)	1	3	—	—	1	4	3	—	3	1	—	—	—	—	1	—
Non-venereal diseases of the male genital organs	1	14	—	1	2	22	—	—	6	12	4	2	—	4	1	1
Cysts and other benign tumors of the ovary	—	—	1	—	—	1	—	—	—	—	—	—	—	—	—	—
Salpingitis or pelvic abscess	—	—	1	1	—	—	—	1	—	—	—	—	—	—	—	5
Benign tumors of the uterus	—	—	1	—	—	—	—	—	—	—	—	—	—	—	1	—
Non-puerperal uterine hemorrhage	—	—	1	—	—	—	—	—	—	—	1	—	—	—	1	—
Metritis	—	—	2	—	—	—	—	—	—	2	4	1	—	—	—	1
Other diseases of the female genital organs	—	1	3	1	—	3	—	3	3	—	12	7	—	—	1	4
Non-puerperal diseases of the breast (cancer excepted)	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—
The Puerperal State:																
Accidents of pregnancy:																
Abortion	—	—	9	—	—	1	—	1	2	—	6	3	—	—	—	8
Ectopic gestation	—	—	1	—	1	—	—	—	—	—	1	—	—	—	—	1
Other accidents of pregnancy	—	—	1	—	—	—	—	—	1	—	10	7	—	—	—	1
Puerperal hemorrhage	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1
Other accidents of childbirth:																
Caesarian section	—	—	—	—	—	—	—	—	—	—	1	—	—	—	1	—

MEDICAL DEPARTMENT

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TREATED IN HOSPITALS—Continued

Jamaica Division				Panama Division				Preston Division				Tela Railroad				Truxillo Railroad				Total		Grand Total	Deaths in Hospitals
Emp.		Non-Emp.		Emp.		Non-Emp.		Emp.		Non-Emp.		Emp.		Non-Emp.		Emp.	Non-Emp.						
W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.								
-	-	-	-	-	9	-	6	1	1	-	-	-	16	1	10	1	28	-	-	137	49	186	-
-	-	-	-	-	-	-	1	2	-	-	-	-	-	-	-	-	6	-	-	41	3	44	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-
-	-	-	-	-	9	-	3	2	1	1	-	2	41	-	-	-	-	-	-	81	26	107	-
-	-	-	-	1	4	-	5	17	8	10	1	1	7	18	3	3	12	-	-	89	58	147	3
-	-	-	-	1	26	-	-	5	12	-	2	1	1	-	-	2	14	-	-	142	21	163	1
-	-	-	-	-	1	-	-	-	4	-	1	-	-	-	1	-	-	-	1	15	5	20	5
-	-	-	-	-	6	-	9	7	3	4	-	1	-	-	1	1	2	-	2	40	18	58	-
-	-	-	-	-	2	-	3	-	1	-	-	-	-	-	2	-	-	-	-	31	22	53	3
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	1	5	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	1
-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	1	3	-	-	12	-	12	1
-	-	-	-	-	-	-	-	1	2	-	-	-	-	-	-	-	-	-	-	16	3	19	5
-	-	-	-	-	1	-	-	-	-	1	-	-	2	2	-	-	-	-	-	6	3	9	-
-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	1	-	-	15	3	18	2
-	-	-	-	1	7	-	3	-	-	-	-	-	3	1	1	1	9	-	1	88	22	110	2
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	1	-	1	1	-	-	-	-	-	-	-	-	1	5	10	15	11
-	-	-	-	8	19	-	8	-	-	1	-	3	3	-	1	-	1	-	-	36	11	47	-
-	-	-	-	1	3	-	1	-	-	-	-	-	3	1	1	1	29	-	2	57	9	66	10
-	-	-	-	2	63	1	17	4	9	2	1	4	5	1	3	1	37	1	2	268	48	316	46
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	-	-
-	-	-	-	1	1	-	2	3	2	1	-	-	2	3	-	-	1	-	-	21	15	36	4
-	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	2	2	-	-	6	3	9	-
2	-	1	-	-	2	1	2	1	1	-	-	-	5	2	-	-	6	-	-	31	10	41	-
-	-	-	-	-	21	1	5	1	6	-	1	-	6	-	1	-	8	-	-	79	18	97	1
-	-	-	-	-	5	-	-	-	-	-	-	-	6	-	2	-	5	-	-	25	4	29	-
-	-	-	-	-	1	-	-	-	1	-	-	-	-	-	-	-	-	-	-	15	4	19	-
-	1	-	-	4	28	-	2	1	15	4	-	9	71	9	7	1	13	-	1	204	32	236	-
-	-	-	-	-	-	1	8	1	-	4	-	-	-	1	6	-	-	-	-	2	21	23	-
-	-	-	-	-	4	-	8	-	1	2	3	-	3	9	14	-	-	-	1	8	45	53	1
-	-	-	-	-	-	-	12	1	-	-	-	-	-	1	-	-	-	1	-	1	16	17	-
-	-	-	-	-	-	1	3	-	-	-	-	-	-	-	-	-	2	3	-	-	13	13	-
-	-	-	-	-	-	-	-	-	-	-	-	-	1	3	7	-	-	-	4	3	22	25	-
-	-	-	-	-	2	4	30	-	2	4	5	-	5	32	25	-	-	-	-	16	131	147	-
-	-	-	-	-	2	1	2	-	-	-	-	-	1	-	-	-	-	-	1	3	5	8	-
-	-	-	-	-	1	1	11	-	-	3	3	1	1	4	7	-	-	1	8	6	65	71	1
-	-	-	-	-	-	-	2	-	-	1	-	-	-	1	1	-	-	-	1	1	9	10	-
-	-	-	-	-	-	-	-	-	-	2	-	1	-	6	14	-	-	-	-	2	41	43	3
-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	2	-	4	4	2
-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	3	3	-

MEDICAL DEPARTMENT

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TREATED IN HOSPITALS—Continued

Jamaica Division				Panama Division				Preston Division				Tela Railroad				Truxillo Railroad				Total		Grand Total	Deaths in Hospitals
Emp.		Non-Emp.		Emp.		Non-Emp.		Emp.		Non-Emp.		Emp.		Non-Emp.		Emp.		Non-Emp.					
W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	Emp.	Non-Emp.				
-	-	-	-	-	-	1	2	-	-	-	-	-	-	2	-	-	-	1	12	13	-		
-	-	-	-	-	-	1	-	-	-	1	-	-	-	2	1	-	1	3	2	14	16	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	3	-	1	2	3	9	12	7	
-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	-	-	1	1	1	8	9	2	
-	-	-	-	-	-	9	29	-	-	13	9	-	3	50	95	-	2	2	5	277	282	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2	-	-	-	1	9	10	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
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-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					

	CLASSIFICATION OF DISEASES															
	Banes Division				Colombia Division				Costa Rica Division				Guatemala Division			
	Emp.		Non-Emp.		Emp.		Non-Emp.		Emp.		Non-Emp.		Emp.		Non-Emp.	
	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.
Diseases of Early Infancy:																
—Continued																
Other diseases peculiar to early infancy:																
Asphyxia neonatorum	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Atalectasis	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Umbilical infection	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Umbilical hemorrhage	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Others	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Lack of care	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Old Age:																
Old age (senility)	1	—	—	—	—	—	—	—	—	—	2	—	2	—	—	1
External Causes:																
Suicide (state the method)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Poisoning by food	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Poisoning by venomous animals	—	—	—	—	—	—	—	—	9	5	1	3	—	5	1	—
Other acute poisonings	—	—	—	—	—	1	—	—	2	2	4	—	—	—	—	—
Burns and scalds	1	1	3	2	—	2	5	—	2	3	—	1	—	3	—	3
Mechanical suffocation	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Absorption of irrespirable or poisonous gas	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Accidental drowning	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Injury by firearms	—	—	—	2	2	18	—	1	1	3	2	3	—	10	1	1
Injury by cutting or piercing instruments	25	144	1	5	2	58	—	2	49	23	5	6	1	125	1	29
Injury by falls	3	5	4	—	8	33	1	—	22	18	6	3	4	30	4	8
Traumatism by machines	4	8	2	1	—	3	—	1	1	1	1	2	—	—	—	4
Traumatism by other crushing (vehicles, railways, landslides, etc.)	7	26	2	3	1	11	1	1	11	26	4	3	—	18	1	16
Injuries by animals (not poisoning)	2	—	2	—	3	4	1	—	—	—	—	—	—	1	1	1
Over-exertion	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Starvation	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Effects of heat	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Lightning	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Electricity	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Homicide by firearms	—	—	—	—	—	1	—	—	—	—	—	—	—	1	—	—
Homicide by cutting or piercing instruments	—	—	—	—	—	—	—	—	—	—	—	—	—	2	—	—
Homicide by other means	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Infanticide	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Dislocations	—	1	—	—	—	—	—	—	1	—	—	—	—	—	—	—
Sprains	2	5	—	—	4	6	—	—	3	2	—	—	—	—	—	1
Fractures (cause not specified)	5	7	6	1	2	10	2	—	15	8	4	8	—	4	—	1
Other external violence:																
Criminal abortion	—	—	—	—	—	—	—	—	—	—	2	1	—	—	—	—
Explosions	—	—	—	—	—	1	1	—	1	—	—	—	—	2	—	—
Salvarsan injection	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other medicaments (injections)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other external violence	2	1	2	—	3	15	1	—	46	36	9	6	—	4	—	2
Ill-Defined Diseases:																
Sea-sickness	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Ill-defined organic diseases	—	—	—	—	—	4	1	—	—	—	—	—	—	1	—	—
Sudden death	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
No disease; malingering	—	20	4	1	—	—	—	—	5	4	16	7	2	—	16	23
Infections of undetermined origin	2	6	—	—	2	3	1	—	1	—	1	—	—	3	—	2
TOTAL	246	1,237	179	48	467	2,407	61	51	2,322	823	727	290	168	2,371	209	1,054

NOTE: This table gives only cases treated in our hospitals and does not show the number of treatments.

CLASSIFICATION OF DISEASES TREATED

	Banes Division				Colombia Division				Costa Rica Division				Guatemala Division			
	Emp.		Non-Emp.		Emp.		Non-Emp.		Emp.		Non-Emp.		Emp.		Non-Emp.	
	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.
Endemic or Infectious Diseases:																
Malaria or cachexia (No. 5)	267	141	277	99	130	484	78	94	607	475	132	126	123	2,657	131	559
Influenza (No. 11)	314	141	302	97	247	1,313	71	85	153	153	36	14	8	66	2	12
Dysentery (No. 16)	13	11	9	4	40	233	33	38	13	18	7	8	—	—	—	—
Veneral infections (No. 38 to 40 inclusive)	36	51	16	17	118	456	63	109	224	292	61	74	11	263	16	76
Other endemic or infectious diseases (1 to 42 inc., excepting No. 5, 11, 16, 38 to 40)	45	41	128	62	27	46	21	32	66	52	32	20	—	12	—	—
General Diseases not Included Above:																
Cancer (No. 43 to 49 inc.)	2	—	4	1	—	3	6	13	3	2	2	1	4	9	18	11
Benign tumors and tumors not returned as malignant (No. 50)	8	2	5	4	1	1	—	2	—	1	—	—	—	—	—	—
Rheumatism or gout (No. 51 and 52)	96	79	46	25	55	459	17	26	185	393	13	16	18	296	25	46
Anemia: chlorosis (No. 58)	44	35	194	57	16	51	23	20	30	14	18	7	11	66	23	30
Other general diseases (No. 42 to 69 inc., excepting No. 43 to 52 inc., and 58)	27	16	19	9	16	64	13	15	14	11	11	2	10	49	3	11
Diseases of the Nervous System and Organs of Special Sense:																
Diseases of the nervous system (No. 70 to 84 inc.)	50	28	97	27	35	209	46	41	65	75	7	11	9	56	10	22
Diseases of the organs of vision and adnexa (No. 85)	64	46	39	5	63	228	22	42	115	79	5	7	5	58	10	19
Diseases of the organs of hearing and the mastoid process (No. 86)	16	22	22	10	16	37	19	16	34	16	6	3	4	18	—	5
Diseases of the Circulatory System:																
Organic diseases of the heart (No. 87 to 90 inc.)	10	5	9	9	7	44	13	20	11	20	5	8	—	11	6	2
Other diseases of the circulatory system (No. 87 to 96 inc. excepting No. 87 to 90)	26	7	17	5	16	87	13	26	32	49	11	11	1	3	—	—
Diseases of the Respiratory System:																
Bronchitis (No. 99)	44	17	52	42	21	134	27	32	173	365	43	20	57	442	50	117
Pneumonia and pleurisy (No. 100 to 102, inc.)	15	14	33	16	6	10	6	15	4	12	3	8	—	5	—	—
Other diseases of the respiratory system (No. 97 to 106, inc., excepting No. 99 to 102)	57	30	57	11	42	175	29	48	51	49	7	10	4	4	—	1
Diseases of the Digestive System:																
Diseases of the mouth and adnexa (No. 108)	29	23	53	14	36	196	25	30	59	83	7	11	11	174	13	98
Diarrhea and enteritis (No. 113 and 114)	41	24	317	212	32	101	72	69	36	42	12	21	7	51	10	12
Ankylostomiasis (No. 115)	2	—	52	10	30	197	26	54	16	9	8	3	—	—	—	—
Other diseases of the digestive system (No. 108 to 127, inc., excepting 108 and 113 to 115, inc.)	199	121	300	100	327	1,271	226	191	435	541	112	87	74	403	84	125
Non-Venereal Diseases of the Genito-Urinary System and Its Adnexa:																
No. 128 to 142 inc.	56	36	150	63	39	173	122	164	53	99	53	50	7	31	8	33
The Puerperal State:																
No. 143 to 150	—	—	34	8	—	10	14	33	3	—	23	16	—	—	—	—
Diseases of the Skin and of the Cellular Tissue:																
Boil, carbuncle, furuncle (No. 152)	56	25	26	8	59	296	55	28	69	14	9	—	4	—	1	1
Phlegmon, acute abscess (No. 153)	103	76	116	44	43	129	18	27	37	52	5	12	30	192	19	87
Ground itch	1	2	6	—	8	14	4	2	2	—	1	2	—	—	—	2
Ulcer of the skin	17	9	10	2	16	81	5	9	28	18	2	2	15	376	18	137
Other diseases of the skin or cellular tissue and adnexa (No. 151 to 154 inc., excepting No. 152 and 153, and "Ground itch" and "Ulcer of the skin")	76	49	117	33	101	375	49	38	176	129	40	30	24	118	17	22
Diseases of the Bones and Organs of Locomotion:																
No. 155 to 158	2	5	5	—	8	10	6	7	15	56	—	—	—	—	—	—

N HOSPITAL DISPENSARIES

Jamaica Division				Panama Division				Preston Division				Tela Railroad				Truxillo Railroad				Total		Grand Total
Emp.		Non-Emp.		Emp.		Non-Emp.		Emp.		Non-Emp.		Emp.		Non-Emp.		Emp.		Non-Emp.		Emp.	Non-Emp.	
W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.			
24	180	7	7	189	746	113	385	180	254	206	235	129	735	74	195	527	6,296	133	305	14,094	3,156	17 250
68	269	40	18	9	19	7	2	37	26	34	22	87	244	36	25	3	54	—	—	3,211	803	4,014
2	8	—	—	—	5	3	2	29	39	29	30	4	12	3	12	1	27	—	5	455	183	638
1	34	—	—	25	140	3	40	39	91	17	22	168	372	21	66	40	867	—	16	3,233	617	3,850
1	4	1	—	1	4	—	4	13	19	21	25	3	31	2	14	—	71	1	10	436	373	809
—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	23	57	80
—	1	—	—	—	—	1	1	—	—	—	—	1	4	4	14	—	—	—	—	19	31	50
11	52	4	2	14	87	8	8	23	46	22	16	24	149	8	18	124	526	14	32	2,637	346	2,983
15	44	22	9	17	15	15	10	4	7	15	4	13	49	39	54	2	21	2	5	454	547	1,001
1	—	4	—	2	4	1	1	20	33	41	23	108	168	53	124	—	4	—	—	547	330	877
39	53	13	4	19	44	16	12	32	54	34	24	64	194	26	69	9	94	5	5	1,129	469	1,598
6	28	9	5	32	79	14	21	63	112	32	18	48	105	22	18	30	264	1	24	1,425	313	1,738
5	6	2	1	17	17	13	9	8	15	12	18	20	32	21	27	14	123	2	10	420	196	616
—	1	—	—	3	10	6	11	4	10	6	9	—	2	1	8	3	10	—	2	151	115	266
5	20	8	2	4	5	8	3	17	19	7	5	4	7	5	10	4	9	—	1	315	132	447
—	1	—	—	67	296	43	45	49	56	47	47	57	209	48	53	158	1,707	29	55	3,853	750	4,603
—	10	—	—	4	37	1	8	11	19	11	16	1	8	—	1	—	5	—	3	161	121	282
9	12	4	2	36	141	18	29	20	18	32	18	79	291	38	66	5	52	—	4	1,075	374	1,449
5	16	1	—	16	131	19	23	56	215	26	47	16	23	12	3	20	433	4	30	1,542	416	1,958
7	16	13	5	2	6	7	4	19	23	64	75	31	40	8	25	7	118	2	12	603	940	1,543
—	7	1	2	4	3	4	12	2	—	1	—	2	3	12	20	1	—	—	—	276	205	481
85	222	67	16	164	467	88	108	96	117	125	118	279	426	118	148	144	1,139	31	68	6,510	2,112	8,622
12	37	15	6	51	51	52	136	15	16	50	50	26	86	39	78	5	88	—	8	881	1,082	1,963
—	1	1	—	—	—	1	—	—	—	23	14	—	—	—	7	—	1	—	—	15	174	189
3	7	3	1	14	2	2	1	30	19	13	10	46	110	9	18	4	104	—	3	862	188	1,050
2	9	5	—	24	36	11	23	50	79	62	35	10	54	11	25	8	315	3	12	1,249	515	1,764
—	1	—	—	10	1	—	1	2	—	9	—	14	6	—	1	2	14	—	1	77	29	106
—	9	1	2	9	55	8	25	40	57	19	16	76	610	31	131	43	983	6	31	2,442	455	2,897
14	24	12	5	131	158	67	46	38	55	51	25	297	486	90	132	103	364	—	7	2,718	781	3,499
—	2	—	—	24	72	4	12	—	1	1	—	11	36	4	7	1	3	—	—	246	46	292

CLASSIFICATION OF DISEASES TREATED

	Banes Division				Colombia Division				Costa Rica Division				Guatemala Division			
	Emp.		Non-Emp.		Emp.		Non-Emp.		Emp.		Non-Emp.		Emp.		Non-Emp.	
	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.
Malformations:																
No. 159	-	-	1	-	-	-	1	2	-	2	-	2	-	-	-	-
Diseases of Early Infancy:																
No. 160 to 163 inc.	-	-	32	12	-	-	2	1	-	-	6	4	-	-	-	-
Old Age:																
No. 164	-	-	3	-	-	1	-	1	-	-	-	1	-	-	-	-
External Causes:																
Injury by firearms (No. 183)	1	1	-	2	6	6	-	3	-	-	-	5	-	-	-	-
Injury by cutting or piercing instruments and falls (Nos. 184 and 185)	213	174	96	24	56	341	22	19	63	108	16	16	63	285	17	135
Traumatism by machines and other means (No. 187 and 188)	253	253	10	9	7	42	5	1	49	37	3	4	-	-	-	-
Dislocations, sprains, fractures (No. 201)	25	16	14	6	26	85	8	4	21	8	3	7	1	1	1	-
Other external causes (No. 165 to 203 inc., except- ing 183 to 185; 187, 188 and 201)	18	43	25	8	34	147	11	14	75	143	11	15	5	75	7	34
Ill-Defined Diseases:																
Nos. 204 and 205	33	8	42	31	36	91	4	4	101	64	598	39	-	-	-	-
TOTAL	2,261	1,551	2,735	1,086	1,720	7,600	1,175	1,375	3,018	3,481	1,313	673	506	5,726	489	1,597

NOTE. This table gives only *cases* treated in our hospital dispensaries and does not show the number of *treatments*.
The chart numbers used are taken from the "International List of Causes of Sickness and Death." These chart numbers are used universally by public health and city and state health departments and organizations.

IN HOSPITAL DISPENSARIES—Continued

Jamaica Division				Panama Division				Preston Division				Tela Railroad				Truxillo Railroad				Total		Grand Total
Emp.		Non-Emp.		Emp.		Non-Emp.		Emp.		Non-Emp.		Emp.		Non-Emp.		Emp.		Non-Emp.		Emp.	Non-Emp.	
W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.	W.	C.			
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	6	8
-	-	2	2	-	-	2	2	-	-	6	15	-	-	-	-	-	-	-	-	-	86	83
-	-	-	-	-	1	-	2	-	-	-	-	-	1	-	-	-	-	-	-	5	7	12
-	-	-	-	1	-	-	-	1	7	1	6	-	8	1	4	1	60	-	3	92	25	117
8	159	15	1	7	62	5	5	200	381	67	69	55	294	17	46	36	537	-	2	3,042	572	3,614
2	57	2	-	-	8	-	1	20	55	4	4	11	40	1	4	4	56	-	-	894	48	942
4	26	6	1	9	16	7	7	9	38	2	6	11	9	3	2	2	36	1	-	343	78	421
26	874	120	913	36	152	21	21	139	302	28	70	18	32	-	6	7	41	-	1	2,167	1,305	3,472
12	30	192	90	22	18	25	25	3	7	9	27	151	85	69	45	-	135	-	9	796	1,209	2,005
367	2,170	570	1,094	963	2,888	593	1,045	1,269	2,190	1,128	1,119	1,864	4,961	826	1,476	1,308	14,557	234	664	58,400	19,192	77,592

Enucleation	3	1	1	—	1	1	2	—	9
Hordeolum	—	—	—	—	—	—	15	—	16
Pterygium, excision of	1	—	—	—	—	—	4	—	11
Pterygium, transplantation of	2	—	—	—	—	—	—	—	4
Removal of foreign body	44	84	4	—	—	175	79	13	477
Trachoma, treatment of	—	15	—	—	—	—	—	—	15

Nose and Throat:

Peritonsillar abscess, incision of	2	—	—	—	—	—	—	—	3
Removal of foreign body	19	3	2	1	1	1	5	—	33
Removal of polypi	—	3	—	—	—	—	5	—	9
Removal of tonsils and adenoids	18	7	8	—	14	40	11	4	103
Turbinectomy	—	—	—	—	—	—	—	1	1

GENITO-URINARY TRACT:

Chancroid operations	7	1	1	—	1	—	52	2	299
Circumcisions	13	9	16	—	19	29	26	7	143
Curettagc uteri	13	—	5	—	—	5	9	—	41
Cystotomy	1	1	1	—	—	—	—	—	8
Epididymectomy	—	—	—	—	5	—	4	—	10
Epididymotomy	—	—	2	—	—	—	3	2	7
Hydrocele	11	8	4	2	6	9	4	3	59
Miscellaneous	—	1	—	—	—	—	11	8	26
Orchidectomy	—	—	1	—	2	3	1	—	11
Perineorrhaphy	3	—	1	—	1	—	3	—	10
Penis, operations on	10	—	4	—	2	—	5	—	23
Scrotum operations	3	6	—	—	2	—	4	1	17
Trachelorrhaphy	1	—	1	—	—	—	—	—	2
Urethral operations	—	120	20	—	132	43	38	4	390
Urethrotomy, external	—	2	3	—	—	2	3	—	17
Urethrotomy, internal	33	1	—	—	—	—	2	—	41
Vaginal operations	22	7	—	1	7	1	—	1	39
Vaginal puncture for pelvic cellulitis	—	1	—	—	—	—	—	—	1
Varicocele, radical cure	—	1	1	—	—	—	—	1	3

HERNIOTOMY:

Femoral	22	4	—	—	—	—	2	—	28
Inguinal	2	40	5	—	23	23	6	15	126
Strangulated	—	1	2	—	2	1	2	2	15
Umbilical	—	2	—	—	3	—	—	—	5
Ventral	—	1	—	—	—	1	—	—	3

SURGICAL REPORT—Continued

JOINTS, OPERATIONS ON:

	Banes Division	Colombia Division	Costa Rica Division	Guate- mala Division	Jamaica Division	Panama Division	Preston Division	Tela Railroad	Truxillo Railroad	Total
Arthrectomy	—	—	—	—	—	—	—	1	—	1
Arthrotomy	—	8	1	3	1	—	—	8	1	22
Reduction of dislocation	27	7	12	—	3	1	2	4	1	57

LAPAROTOMY:

Abdomen, penetrating wound of	—	1	—	—	—	—	—	5	1	7
Appendectomy	29	2	18	16	1	6	48	27	9	156
Cholecystotomy	—	—	1	—	—	1	1	1	3	7
Ectopic gestation	1	—	1	1	—	1	1	2	—	7
Enterorrhaphy	—	1	2	—	—	—	—	—	—	3
Exploratory	3	—	3	1	1	9	8	4	—	29
Gastro-enterostomy	—	—	2	2	—	1	4	1	—	10
Hysterectomy	1	1	2	2	—	15	4	6	—	31
Hysteropexy	—	1	—	—	—	—	4	3	—	8
Hysteropexy with perineorrhaphy	—	—	—	—	—	—	—	4	—	4
Intussusception, reduction of	—	—	3	—	—	—	—	—	—	3
Myomectomy	—	1	—	—	—	—	—	—	—	1
Ovariectomy	2	2	—	1	—	1	6	5	—	17
Ovariotomy	—	—	—	—	—	—	2	—	—	2
Paracentesis abdominalis	27	5	1	2	—	9	2	—	—	44
Peritonitis, general	—	—	—	—	—	—	2	4	—	6
Pylorotomy	—	—	1	2	—	—	—	—	—	3
Salpingectomy	—	—	—	—	—	10	—	—	—	10
Salpingo-oophorectomy	4	1	6	3	—	13	11	16	—	54

MUSCLES AND TENDONS, OPERATIONS ON:

Operations on muscles and tendons	26	2	2	5	—	4	20	4	7	70
---	----	---	---	---	---	---	----	---	---	----

OBSTETRICAL:

Abortions	13	—	1	2	—	6	10	11	10	53
Breech presentations	—	—	—	1	—	—	—	—	—	1
Cæsarian operations	—	—	—	1	—	—	—	—	1	2
Forceps operations	2	—	5	—	—	4	5	3	2	21
Normal births	10	—	29	22	—	36	22	49	16	184
Podalic version	—	—	2	1	—	—	2	1	—	6
Premature births	—	1	—	—	—	—	—	9	1	11
Shoulder presentations	2	—	—	—	—	—	—	5	—	7
Twins	—	—	—	—	—	1	—	2	—	3

PLASTIC OPERATIONS:

Plastic operations	10	5	1	4	—	3	6	2	—	31
------------------------------	----	---	---	---	---	---	---	---	---	----

RECTUM:

Fistula in ano	4	5	2	1	—	7	1	2	2	24
Hemorrhoids	8	30	4	1	2	25	9	11	3	93
Ischio-rectal abscess	1	5	1	1	—	1	—	5	1	15

MISCELLANEOUS:

Abscesses, treatment of	466	599	232	549	18	148	302	285	494	3,093
Abscess of liver	—	2	11	—	—	—	—	—	1	14
Carbuncle, treatment of	72	91	77	3	—	1	9	21	7	281
Cysts, treatment of	27	26	62	—	3	14	11	4	—	147
Fistulous tracts, treatment of	3	11	2	—	—	—	2	4	1	23
Injectons, intravenous	301	489	1,411	154	—	744	430	872	2,360	6,761
Mastitis, incision of	4	—	—	1	—	—	—	19	—	24
Nails, extirpation of	30	5	12	4	6	3	9	9	2	80
Neoplasm, excision of	11	7	—	1	—	—	4	15	2	40
Perineorrhaphy	—	—	—	1	—	—	—	1	—	2
Removal of foreign body	30	12	6	4	4	17	2	20	4	99
Skin graft	1	1	—	1	—	1	—	2	6	11
Snake-bite, incised and curretted	—	—	—	—	—	—	—	3	—	15
Thyroidectomy	—	—	—	—	—	—	1	1	—	2
Tooth extractions	26	346	953	206	15	409	279	75	428	2,737
Uleers, treatment of	127	27	184	523	—	3	62	235	63	1,224
Vaccinations	—	—	—	—	1,892	—	—	—	—	1,892
Varicose veins	1	1	5	—	—	2	2	2	—	13
Venesection	4	—	—	—	—	—	—	—	—	4
Wounds, burns and scalds	—	1	—	—	—	—	9	—	—	10
Wounds, gunshot	5	4	10	5	—	10	8	29	16	87
Wounds, other	1,012	39	847	583	32	43	544	76	77	3,253
Wounds, stab	1	2	8	27	—	1	116	25	12	192
Various other major operations	—	5	10	5	—	5	1	9	21	56
Various other minor operations	66	29	638	92	—	110	5	71	53	1,064
	2,803	2,151	5,282	2,359	1,993	1,948	2,418	2,535	3,747	25,236

LABORATORY

	Banes Division		Colombia Division		Costa Rica Division		Guatemala Division	
	Hosp.	Hosp. Disp.	Hosp.	Hosp. Disp.	Hosp.	Hosp. Disp.	Hosp.	Hosp. Disp.
BLOOD EXAMINATIONS:								
Total examinations	1,619	113	3,009	104	4,838	282	3,732	15
Negative findings	1,054	74	2,317	85	3,261	74	2,229	10
Blood culture	—	—	—	—	21	5	—	—
Erythrocyte enumerations	21	5	1	—	35	22	4	1
Filaria	—	—	—	1	—	1	—	—
Hemoglobin estimations	464	45	2,986	93	1,075	39	4	—
Leucocyte differential enumerations	217	2	7	1	37	21	37	—
Malaria:								
(a) Aestivo-autumnal	166	17	317	7	131	7	629	1
(b) Mixed infections	15	—	75	—	30	3	28	—
(c) Quartan	1	—	25	—	12	5	—	—
(d) Tertian	183	4	322	11	659	22	800	3
Wassermann's positive	—	—	—	—	201	95	—	—
Widal, positive	—	—	—	—	5	—	—	—
Other findings	25	—	6	1	39	7	1	—
SMEARS:								
Total examinations	36	33	54	25	123	49	18	3
Negative	14	10	23	7	21	13	3	2
Bacillus coli	12	10	6	2	13	7	—	—
Bacillus diplococci, pneumococci, etc.	1	3	—	—	30	2	2	—
Bacillus gonococci	7	10	11	14	30	15	11	—
Bacillus lepræ	—	—	2	—	—	—	—	—
Bacillus lepothrix bucallis	—	—	—	—	1	—	—	—
Bacillus tubercle	—	—	3	—	20	5	—	—
Mycetoma	—	—	—	—	—	—	—	—
Other positive smears for micro-organisms	6	2	13	2	35	12	2	1
Treponema pallidum	—	—	—	—	—	—	—	—
SPUTUM EXAMINATIONS:								
Total examinations	68	14	101	16	143	30	104	5
Negative	13	4	20	2	24	6	71	2
Bacillus influenza	4	—	22	1	19	8	5	—
Bacillus tubercle	17	1	18	8	28	7	23	3
Diplococci, pneumococci, etc.	37	11	44	1	49	6	5	—
Entameba	20	—	—	1	—	—	—	—
Other non-specific micro-organisms	—	—	38	8	53	11	—	—
STOOL EXAMINATIONS:								
Total examinations	1,486	413	2,835	157	3,704	391	3,632	9
Negative	560	141	119	41	1,069	96	572	5
Ankylostoma	209	35	935	28	807	148	552	—
Ankylostoma and ascaris	90	16	327	3	247	36	429	—
Ankylostoma and trichocephalus	144	24	820	10	395	40	547	2
Ankylostoma, ascaris and strongylus	23	10	24	—	39	—	68	—
Ankylostoma, ascaris and trichocephalus	87	14	367	2	150	12	—	—

REPORT

Jamaica Division		Panama Division		Preston Division		Tela Railroad		Truxillo Railroad		Total	
Hosp.	Disp.	Hosp.	Disp.	Hosp.	Disp.	Hosp.	Disp.	Hosp.	Disp.	Hosp.	Disp.
-	42	3,195	1,676	1,816	22	6,005		7,164		31,378	2,254
-	2	1,153	669	1,231	19	3,369		4,466		19,080	933
-	-	-	1	13	-	50		-		84	6
-	2	10	1	7	-	4		1		83	31
-	-	-	-	3	-	-		-		3	2
-	22	30	9	-	-	232		11		4,802	208
-	3	151	24	40	-	169		6		664	51
-	4	91	103	185	1	560		1,873		3,952	140
-	-	2	-	93	-	76		21		340	3
-	-	1	-	6	-	47		19		111	5
-	17	1,757	869	195	-	549		914		5,379	926
-	-	-	-	-	-	1,735		-		1,936	95
-	-	-	-	7	-	16		-		28	-
-	-	-	-	63	2	22		8		164	10
-	3	31	42	18	-	208		5		493	155
-	-	5	15	9	-	117		-		192	47
-	-	-	-	-	-	-		-		31	19
-	2	-	-	-	-	-		-		33	7
-	2	17	24	9	-	82		5		172	65
-	-	1	-	-	-	-		-		3	-
-	-	-	-	-	-	-		-		1	-
-	-	-	-	-	-	-		-		23	5
-	-	-	-	-	-	-		-		-	-
-	-	7	3	2	-	9		-		74	20
-	-	1	-	-	-	-		7		8	-
-	11	316	35	164	2	631		277		1,804	113
-	2	294	31	52	2	563		210		1,247	49
-	-	-	-	1	-	-		-		51	9
-	1	17	4	24	-	68		67		262	24
-	8	5	-	45	-	-		-		185	26
-	-	-	-	-	-	-		-		20	1
-	1	-	-	42	-	-		-		133	20
-	85	2,914	76	1,494	15	3,345		6,477		25,887	1,146
-	73	1,009	21	809	5	1,053		2,054		7,245	382
-	4	405	2	148	1	790		804		4,650	218
-	1	37	2	28	-	168		294		1,620	58
-	-	289	14	39	2	300		480		3,014	92
-	-	1	-	2	-	14		22		193	10
-	1	26	4	9	-	121		711		1,769	34

LABORATORY

	Banes Division		Colombia Division		Costa Rica Division		Guatemala Division	
	Hosp.	Hosp. Disp.	Hosp.	Hosp. Disp.	Hosp.	Hosp. Disp.	Hosp.	Hosp. Disp.
Ankylostoma, ascaris, strongylus and trichocephalus	12	1	50	1	19	2	—	—
Ascaris lumbricis	120	49	16	5	594	139	427	—
Ascaris and strongylus	19	3	1	2	177	14	—	—
Ascaris, strongylus and tricho- cephalus	15	6	2	—	96	15	—	—
Ascaris and trichocephalus	106	46	18	5	259	52	299	—
Balantidium coli	51	5	13	1	15	3	13	—
Bilharzia	—	—	—	—	—	—	1	—
Cercomonas intestinalis	25	4	158	5	147	28	8	—
Cestodes:								
(a) Bothriocephalus	—	—	—	—	—	—	—	—
(b) Taenia nana	—	—	8	—	4	—	—	—
(c) Taenia saginata	1	2	9	—	11	3	24	—
(d) Unclassified	—	—	—	—	—	—	—	—
Ciliated monads	—	—	—	—	8	3	36	—
Entameba coli	8	2	6	—	35	14	5	—
Entameba histolytica	4	2	575	71	44	14	1	—
Oxyuris vermicularis	64	3	6	—	6	1	11	—
Strongylus	48	18	108	6	133	40	4	—
Strongylus and oxyuris	12	2	8	—	1	—	—	—
Strongylus and trichocephalus	47	24	150	4	97	19	—	—
Trichocephalus	136	49	151	25	519	90	337	1
Trichomonas	1	—	27	2	31	11	—	—
Other findings								
(a) Bacillus dysenteriae	—	—	—	—	3	2	—	—
(b) Bile	1	—	2	—	32	6	3	—
(c) Blood and pus	105	14	130	12	39	8	88	—
(d) Pus	45	7	6	1	31	7	—	—
(e) Miscellaneous	5	1	—	—	—	—	2	—
URINE EXAMINATIONS:								
Total examinations	1,689	791	2,966	344	3,992	467	3,697	51
Negative	840	366	184	71	2,072	159	3,249	44
Albumin and casts	276	229	1,573	80	1,338	190	400	5
Albumin quantitative examina- tions	29	2	1,213	114	28	5	—	—
Bile	61	15	47	1	65	14	5	—
Blood cells	161	17	728	96	80	17	27	—
Calcium oxalate	36	2	193	7	102	27	9	—
Diazo reaction	—	—	25	3	6	—	—	—
Gonococci	2	1	43	2	14	11	—	—
Guaiac test	1	—	9	2	8	3	—	—
Hæmoglobin	1	—	6	1	44	18	—	—
Indican	65	12	2	1	5	4	4	1
Other findings	223	136	1,984	328	47	11	26	—
Pus	121	31	1,022	91	953	180	186	2
Sugar	13	87	3	12	10	20	—	1
Phenophthalein renal functional tests	—	—	—	—	—	—	—	—
AUTOPSIES:								
Autopsies	2	—	20	—	13	—	10	—

MEDICAL DEPARTMENT

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REPORT—Continued

Jamaica Division		Panama Division		Preston Division		Tela Railroad		Truxillo Railroad		Total	
Hosp.	Disp.	Hosp.	Disp.	Hosp.	Disp.	Hosp.	Disp.	Hosp.	Disp.	Hosp.	Disp.
—	—	1	—	3	—	—	—	36	—	121	4
—	4	32	3	67	2	209	—	370	—	1,835	202
—	—	—	—	—	—	—	—	5	—	202	19
—	—	11	—	1	—	—	—	34	—	159	21
—	1	30	4	13	—	114	—	220	—	1,059	108
—	—	—	—	—	—	—	—	18	—	110	9
—	—	—	—	—	—	—	—	—	—	1	—
—	—	1	—	—	—	—	—	129	—	468	37
—	—	—	—	4	—	—	—	—	—	4	—
—	—	—	—	—	—	—	—	7	—	19	—
—	—	1	—	—	—	—	—	3	—	49	5
—	—	—	—	—	—	3	—	2	—	5	—
—	—	3	—	3	1	2	—	—	—	52	4
—	—	—	—	18	—	10	—	27	—	109	16
—	—	15	1	65	—	65	—	35	—	804	88
—	—	17	1	32	—	—	—	2	—	138	5
—	—	241	1	48	—	8	—	64	—	654	65
—	—	—	—	—	—	—	—	—	—	21	2
—	—	85	3	21	—	—	—	30	—	430	50
—	1	754	16	65	—	341	—	689	—	2,992	182
—	—	4	—	5	—	—	—	—	—	68	13
—	—	—	—	1	—	—	—	—	—	4	2
—	—	22	2	—	—	—	—	2	—	62	8
—	—	29	5	93	2	255	—	629	—	1,368	41
—	—	30	—	74	—	155	—	283	—	624	15
—	—	—	—	105	2	1	—	14	—	127	3
—	232	3,192	191	1,469	46	4,187	—	7,368	—	28,560	2,122
—	173	73	28	1,118	17	2,612	—	4,084	—	14,232	858
—	29	1,646	85	402	5	1,475	—	2,925	—	10,035	623
—	18	6	—	214	—	—	—	299	—	1,789	139
—	16	739	12	10	—	—	—	49	—	976	58
—	4	354	34	176	2	—	—	16	—	1,542	170
—	—	23	3	73	—	—	—	—	—	436	39
—	—	—	—	—	—	—	—	—	—	31	3
—	3	1	—	2	—	—	—	28	—	90	17
—	—	357	34	—	—	—	—	—	—	375	39
—	—	3	—	3	—	—	—	30	—	87	19
—	—	—	—	151	—	—	—	—	—	227	18
—	20	145	19	469	22	280	—	47	—	3,221	536
—	14	2,838	164	507	6	599	—	61	—	6,287	488
—	5	4	—	7	—	—	—	4	—	41	125
—	—	11	1	—	—	36	—	4	—	51	1
—	—	58	—	48	—	65	—	—	—	225	—

LABORATORY

	Banes Division		Colombia Division		Costa Rica Division		Guatemala Division	
	Hosp.	Disp.	Hosp.	Disp.	Hosp.	Disp.	Hosp.	Disp.
MISCELLANEOUS:								
Total examinations	—	—	—	—	165	10	1	—
Bacteriological examinations	—	—	—	—	75	5	—	—
Pathological sections	—	—	—	—	46	—	—	—
Spinal fluid examinations	—	—	—	—	—	—	1	—
Miscellaneous examinations	—	—	—	—	44	5	—	—
TOTAL EXAMINATIONS	4,900		8,985		12,978		11,203	
		1,364		646		1,229		83
TOTAL FINDINGS	6,046		17,344		15,787		11,505	
		1,574		1,278		1,865		85

REPORT—Continued

Jamaica Division		Panama Division		Preston Division		Tela Railroad		Truxillo Railroad		Total	
Hosp.	Disp.	Hosp.	Disp.	Hosp.	Disp.	Hosp.	Disp.	Hosp.	Disp.	Hosp.	Disp.
—	—	7	7	18	—	—	—	—	—	191	17
—	—	—	—	18	—	—	—	—	—	93	5
—	—	—	—	—	—	—	—	—	—	46	—
—	—	—	—	1	—	—	—	—	—	2	—
—	—	7	7	—	—	—	—	—	—	51	12
<hr/>											
—		9,713		5,027		14,441		21,291		88,538	
373			2,027		85						5,807
—		12,850		6,879		16,344		22,119		108,874	
433			2,219		91						7,545

NUMBER AND CLASSIFICATION OF X-RAY EXAMINATIONS

	Costa Rica Division	Panama Division	Preston Division	Tela Railroad	Total
NATURE OF EXAMINATION:					
Vertebral column	4	—	—	6	10
Skull	27	—	—	7	34
Sternum	14	—	—	—	14
Ribs	3	—	—	8	11
Hyoid bone	4	—	—	—	4
Upper limbs	65	12	30	41	148
Lower limbs	73	6	37	39	155
Neck	5	—	—	—	5
Teeth	65	3	17	—	85
Heart	—	—	—	—	—
Lungs	25	4	12	—	41
Liver	6	—	1	—	7
Spleen	3	—	—	—	3
Kidney	—	—	1	6	7
Gastro-intestinal tract	160	8	3	—	171
Pelvic organs	20	1	—	—	21
Miscellaneous	15	10	—	55	80
TOTAL	489	44	101	162	796

METEOROLOGICAL REPORT

AVERAGE TOTAL RAINFALL (INCHES)

MONTH:	Banes Division	Colombia Division	Costa Rica Division	Guatemala Division	Jamaica Division	Panama Division	Preston Division	Tela Railroad	Truxillo Railroad	Average for All Divisions
January	1.97	—	9.08	14.69	4.30	7.77	2.58	6.74	8.98	—
February . . . . .	.64	—	7.80	5.05	2.40	5.45	2.74	1.76	.88	—
March . . . . .	.98	—	7.63	2.85	1.83	5.82	.30	.26	1.17	—
April	1.46	.10	5.68	4.47	2.40	3.67	1.67	.23	.10	—
May	2.25	4.96	11.30	2.22	8.40	4.99	3.31	1.40	2.29	—
June	1.00	1.94	18.75	8.83	2.09	14.15	3.94	4.92	5.92	—
July	1.54	.83	15.68	11.82	2.17	14.50	3.00	4.80	6.07	—
August	1.00	1.10	19.80	9.80	3.87	16.36	1.14	4.83	4.94	—
September	4.02	2.75	10.59	6.50	2.89	9.44	4.18	5.53	5.42	—
October	13.31	8.06	9.57	4.65	11.75	3.32	8.21	8.44	6.33	—
November	9.10	1.27	22.84	6.34	7.46	16.01	3.30	8.95	5.97	—
December	1.30	.10	25.52	6.56	3.74	20.70	1.14	4.35	5.50	—
TOTALS	38.57	21.11	164.24	83.78	53.30	122.18	35.51	52.21	53.57	69.38

MEAN TEMPERATURE (FAHRENHEIT)

	January	February	March	April	May	June	July	August	September	October	November	December	Average maximum temperature	Average minimum temperature	Average mean temperature
January	78.00	85.00	77.00	74.00	77.80	77.00	77.00	77.80	77.00	77.00	77.00	77.00	79.80	79.00	79.00
February	75.00	81.00	76.00	78.00	76.35	79.70	79.70	76.35	77.00	77.00	77.00	77.00	79.00	79.00	79.00
March	75.00	82.00	80.00	78.00	77.75	80.60	80.60	77.75	78.00	78.00	78.00	78.00	80.20	80.20	80.20
April	78.00	84.00	80.00	80.00	77.90	86.90	86.90	77.90	82.00	82.00	82.00	82.00	83.00	83.00	83.00
May	78.00	82.00	84.00	82.00	84.80	84.20	84.20	84.80	81.00	81.00	81.00	81.00	82.60	82.60	82.60
June	83.00	84.00	87.00	75.00	82.10	84.20	84.20	82.10	83.00	83.00	83.00	83.00	81.70	81.70	81.70
July	89.00	91.00	75.00	80.00	83.50	84.10	84.10	83.50	80.00	80.00	80.00	80.00	87.25	87.25	87.25
August	89.00	81.00	89.00	79.00	84.50	86.90	86.90	84.50	81.00	81.00	81.00	81.00	86.25	86.25	86.25
September	82.00	83.00	88.00	79.00	83.25	85.10	85.10	83.25	78.00	78.00	78.00	78.00	83.60	83.60	83.60
October	80.00	84.00	79.00	78.00	—	90.50	90.50	—	80.00	80.00	80.00	80.00	87.30	87.30	87.30
November	76.00	84.00	78.00	74.00	78.80	85.10	85.10	78.80	78.00	78.00	78.00	78.00	77.58	77.58	77.58
December	76.00	78.00	78.00	75.00	78.40	86.90	86.90	78.40	78.00	78.00	78.00	78.00	80.81	80.81	80.81
Average maximum temperature	88.08	91.75	87.16	89.00	84.64	107.40	107.40	84.64	90.00	90.00	90.00	90.00	87.30	87.30	87.30
Average minimum temperature	70.33	72.17	74.25	68.00	62.89	63.00	63.00	62.89	68.00	68.00	68.00	68.00	77.58	77.58	77.58
Average mean temperature	79.99	83.25	80.70	78.00	80.47	85.20	85.20	80.47	79.00	79.00	79.00	79.00	82.62	82.62	82.62

GENERAL STATEMENT PASSENGER SERVICE

* NEW YORK PASSENGER STEAMSHIPS

	Cala- mares	Car- rillo	Met- apan	Pas- sage- tores	Sir- aola	Tivies	Tolca	Turrialba	Ulua	Total
Number of voyages made	13	13	13	13	13	13	13	14	13	118
Total number of officers, all voyages	300	247	247	299	247	251	297	266	311	2,465
Total number of crew, all voyages	1,353	902	896	1,331	876	893	1,440	1,071	1,412	10,174
Total number of ship's laborers, all voyages	205	501	487	290	517	538	272	311	181	3,302
Number of seamen given physical examination before "sign- ing-on"	1,363	882	899	1,299	859	896	1,380	1,052	1,411	10,041
Number of rejected applicants on "signing-on" day	5	9	1	3	1	1	8	9	12	49
Number of persons rejected at tropical ports	1	1	0	0	0	0	0	0	1	3
Number of cabin passengers carried	3,027	3,019	2,373	2,830	2,687	2,440	3,092	1,870	3,071	24,409
Number of deck passengers carried	350	766	787	278	1,242	1,061	263	863	264	5,874

OFFICERS, CREW AND SHIP'S LABORERS:

Total number of patients treated	779	493	133	228	246	303	462	411	289	3,344
Total number of treatments in office	1,566	806	211	425	371	469	775	595	585	5,803
Total number of treatments in quarters	92	98	23	73	44	177	82	143	112	844

PASSENGERS:

Total number of patients treated	190	169	116	69	117	129	134	151	84	1,159
Total number of treatments in office	192	221	131	70	44	91	147	142	88	1,126
Total number of treatments in staterooms	127	160	93	83	121	97	131	112	130	1,054
Number of vaccinations	139	236	52	140	367	245	202	536	190	2,107
Number of persons detained by quarantine and immigration authorities	26	17	22	39	25	29	15	32	20	225
Number of deaths	0	1	0	1	2	1	1	0	1	7

**NEW ORLEANS PASSENGER STEAMSHIPS

	Aban-garez	Atenas	Car-tago	Coppe-name	Here-dia	Paris-mina	Santa-Marta	Sara-macca	Suri-name	Zacapa	Total
Number of voyages made	17	16	14	25	12	13	7	22	23	14	163
Total number of officers, all voyages	323	303	263	440	225	245	132	391	410	262	2,994
Total number of crew, all voyages	1,252	1,211	997	1,263	884	953	552	1,128	1,100	931	10,271
Total number of ship's laborers, all voyages	483	309	106	—	11	—	75	—	—	508	1,492
Number of seamen given physical examination before "signing-on,"	1,239	1,246	1,024	1,251	940	958	560	1,139	1,210	961	10,528
Number of rejected applicants on "signing-on" day	17	48	33	23	44	13	23	37	8	41	287
Number of persons rejected at tropical ports	—	5	—	—	1	—	—	1	—	2	9
Number of cabin passengers carried	1,524	1,519	1,576	963	1,280	1,557	913	1,003	947	1,311	12,593
Number of deck passengers carried	513	327	294	138	111	196	202	56	99	1,205	3,141

OFFICERS, CREW AND SHIP'S LABORERS:

Total number of patients treated	514	463	437	662	399	561	146	497	703	485	4,867
Total number of treatments in office	744	634	630	995	501	730	191	629	1,001	773	6,828
Total number of treatments in quarters	89	106	90	111	136	49	13	187	78	137	996

PASSENGERS:

Total number of patients treated	69	100	59	92	84	177	49	24	67	79	800
Total number of treatments in office	62	78	78	128	73	242	43	24	78	88	894
Total number of treatments in staterooms	51	101	100	7	74	46	28	23	25	79	534
Number of vaccinations	13	8	105	5	68	31	51	6	79	71	437
Number of persons detained by quarantine and immigration authorities	14	3	10	5	28	13	6	16	14	8	117
Number of deaths	—	1	—	—	—	—	—	1	—	—	2

The deaths aboard steamships of the New York Division were caused by: Peritonitis complicating acute appendix, 1; Suicide by Drowning, 1; Apoplexy, 1; Respiratory failure following injury to cervical vertebrae, 1; Syncope, 1; Fractured skull, 1; Drowning, 1; Total 7.

The deaths aboard steamships of the New Orleans Division were caused by: Malarial Fever, 1; and Asphyxia (mechanical suffocation, due to being covered by coal), 1.

*These statistics include one voyage of the S.S. "Tivives" and five voyages of the S.S. "Turrialba" from the port of New Orleans.

**These statistics include one voyage each of the steamships "Abangarez," "Atenas," "Cartago," "Heredia," and "Parismina"; two voyages of the S.S. "Santa Marta" and three voyages of the S.S. "Zacapa," which these steamers made from the port of New York during the course of the year.

CLASSIFICATION OF DISEASES TREATED ABOARD PASSENGER STEAMSHIPS AND BY PORT MEDICAL OFFICERS
AT NEW YORK, NEW ORLEANS AND BOSTON

	Steamships N. Y. Division		Steamships N. O. Division		Port Med. Officer New York		Port Med. Officer New Orleans		Port Med. Officer Boston		Revere Sugar Refinery	
	Crew	Pass.	Crew	Pass.	Emp.	Non- Emp.	Emp.	Non- Emp.	Emp.	Non- Emp.	Emp.	Emp.
Endemic or infectious diseases (Chart Nos. 1 to 42 incl.)	192	71	288	32	25	—	59	4	10	—	—	—
General diseases not included above (Chart Nos. 43 to 69 f. incl.) . . .	146	37	20	11	18	—	4	1	3	—	—	—
Diseases of the nervous system and or- gans of special sense (Chart Nos. 70 to 86 incl.)	282	71	561	90	51	3	65	1	30	—	—	—
Diseases of the circulatory system (Chart Nos. 87 to 96 incl.)	28	5	12	5	—	—	7	1	3	—	—	—
Diseases of the respiratory system (Chart Nos. 97 to 107 incl.)	310	99	455	67	51	—	34	—	34	4	—	—
Diseases of the digestive system (Chart Nos. 108 to 127 incl.)	988	282	2,106	267	82	—	90	13	47	—	—	128
Non-venereal diseases of the genito- urinary system and its adnexa (Charts Nos. 128 to 142 incl.) . . .	28	18	22	10	3	—	5	3	2	—	—	—
The puerperal state (Chart Nos. 143 to 150 incl.)	—	—	—	4	—	—	—	—	—	—	—	—
Diseases of the skin or cellular tissue (Chart Nos. 151 to 154 incl.) . . .	376	117	314	41	41	1	54	—	59	—	—	260
Diseases of the bones and organs of lo- comotion (Chart Nos. 155 to 158 incl.)	42	4	29	3	1	—	—	—	1	—	—	—
Malformations (Chart Nos. 159 to 159c. incl.)	—	—	—	—	—	—	—	—	—	—	—	—
Diseases of early infancy (Chart Nos. 160 to 163 incl.)	4	3	—	—	—	—	—	—	—	—	—	—
Old age (Chart No. 164)	—	—	—	—	—	—	—	—	—	—	—	—
External causes (Chart Nos. 165 to 203 incl.)	844	137	750	82	402	5	287	7	243	5	2,036	—
Ill-defined diseases (Chart Nos. 204 to 205 incl.)	214	294	200	209	6	—	21	—	—	—	66	—
TOTAL	3,454	1,138	4,757	821	680	9	626	30	432	9	2,490	—

NOTE: This table gives only cases treated on our steamships and does not show the number of treatments.

No cases of quarantinable diseases, i.e., anthrax, Asiatic cholera, leprosy, plague, smallpox, typhus fever or yellow fever occurred aboard our steamships during the year. Furthermore, there were no cases of trachoma. There were eight cases of venereal diseases among the passengers and 83 cases among members of the crew. The chart numbers used are taken from the "International List of Causes of Sickness and Death." These chart numbers are used universally by public health and city and state health departments and organizations.

REPORT OF PORT MEDICAL OFFICERS AND SANITARY INSPECTOR

MEDICAL AND SURGICAL CASES TREATED

Port	Medical Cases			Surgical Cases			No. of Cases	Total No. of Treatments
	No. of Cases	Emp.	Non-Emp.	No. of Cases	Emp.	Non-Emp.		
New York	188	—	—	492	9	—	689	1,817
New Orleans	259	13	—	367	17	—	656	1,535
Boston	Long Wharf	191	4	247	5	—	447	825
	Revere Refinery	531	—	1,959	—	—	2,490	7,495
Cristobal	—	—	—	—	—	—	—	—
GRAND TOTAL	1,169	17	—	3,065	31	—	4,282	11,672

PHYSICAL EXAMINATION OF PROSPECTIVE EMPLOYEES

Port	Total No. Examined	Total No. Rejected	Per Cent Rejected
New York	658	28	4.3
New Orleans	391	50	12.8
Boston	317	21	6.6
Cristobal	40	—	—
TOTAL	1,406	99	7.04

PHYSICAL EXAMINATION OF MEMBERS OF CREWS

Port	Total No. Examined	Total No. Rejected	Per Cent Rejected
New York	10,241	49	0.48
New Orleans	11,409	405	3.55
Boston	3,176	11	0.35
Cristobal	2	—	—
TOTAL	24,828	465	1.87

PHYSICAL CAUSES FOR REJECTION OF MEMBERS OF CREWS

	New York	New Orleans	Boston		New York	New Orleans	Boston
**Typhoid fever	—	—	1	Diseases of the veins (varices, hemorrhoids, phlebitis, etc.)	1	—	—
Malaria, clinical	—	2	—	Pleurisy	—	—	1
Mumps	—	1	—	Other diseases of the respiratory system (tuberculosis excepted)	1	—	—
Acute pulmonary tuberculosis	—	3	—	Hernia	14	46	—
Syphilis, primary	—	8	—	Non-venereal diseases of the male genital organs	4	7	—
Syphilis, tertiary	—	1	—	Trichophytosis	—	2	—
Syphilis, period not specified	2	30	—	Scabies	4	2	—
Soft chancre	3	51	4	Other diseases of the skin and adnexa	—	6	—
Gonococcal infection except that of the eye or adnexa	20	230	5	Diseases of the bones or organs of locomotion	—	1	—
Gonococcal ophthalmia	—	1	—				
Forms of mental alienation	—	1	—	TOTAL	49	405	11
Follicular conjunctivitis	—	8	—				
Trachoma	—	3	—				
Other diseases of the eye or its adnexa	—	2	—				

** Suspected Typhoid carrier.

VACCINATIONS

New York	16
New Orleans	651
Boston	19
Cristobal	185

FUMIGATION

	New York	New Orleans	Boston	Cristobal	Total
Steamships fumigated throughout	30	51	19	—	100
Holds only	1	—	2	—	3
Superstructure only	—	1	3	—	4
Forward quarters	37	3	7	—	47
Aft quarters	32	7	11	—	50
Separate rooms	21	15	15	—	51



Tennis Court with Community House in background, Costa Rica Division

SECTION V

SPECIAL REPORTS

REPORT OF THE PATHOLOGICAL EXAMINATIONS FOR 1923

F. B. MALLORY, M.D., Consulting Pathologist, Boston, Mass.

Tissues were received from forty post-mortem examinations, and from thirty-seven surgical operations. The sectioning of the specimens, and the fixation of them in Zenker's fluid at the various hospitals, has steadily improved so that now practically perfect histological preparations are obtainable from many of them.

The most interesting cases received during the year were the following:

UFA 17 was a colored girl, aged five years, who died from a severe malarial infection of the estivo-autumnal type. Sections of the spleen and the liver showed marked pigmentation, as well as the presence of malaria parasites in most of the red blood-corpuscles.

UFA 11, 30 and 40 all showed hemoglobinuria in varying degrees of intensity. In Numbers 30 and 40 it was associated with malarial infection. In Number 11 the blood was negative clinically for malarial parasites, and no pigment could be found in the spleen or the liver. The autopsy diagnosis was blackwater fever. So far as known, no quinine was administered. UFA 30 was a perfect case of amebic ulceration of the colon, with the parasites present in great numbers in the floor of the ulcers. In addition, there were secondary abscesses of the liver, lung, and pleural cavity, with amebae present in small numbers.

UFA 15, a child five and one-half years old, was treated with the usual dose of carbon tetrachloride for ankylostoma duodenale. Death was due to extensive hemorrhagic central necrosis of the liver, caused by this drug, which acts toxically in the same manner as chloroform.

Of the surgical specimens two were of great interest.

UFA 10 was a case of multiple lesions of the skin of the uncovered parts of the body (face, neck and hands), due to many years of constant exposure to sunlight in the Tropics. The patient, who recovered, was light-complexioned and thin-skinned. The lesions consisted of keratoses, and epidermoid cancers. Four cancers developed on the neck, and were removed surgically. Within a year, one of them returned and had to be removed a second time. Treatment with radium led to great improvement in the remaining lesions, but further over-exposure to sunlight must be considered hazardous.

UFA 27 was a case of chronic lesion involving prepuce and glans, which proved on microscopic examination to be a case of granuloma venereum, in which extension to the inguinal lymph nodes had not occurred. Consequently the nature of the lesion had not been suspected.

In conclusion it may be stated that the method of fixation and staining of the tissues from autopsies has reached a very satisfactory stage, and increasingly valuable results should be obtained. At the same time, it seems advisable to suggest that more might be accomplished through the systematic fixation of surgical material in Zenker's fluid and the study of paraffin sections. One year's work has shown conclusively that the cost would be comparatively slight.

Of the cases mentioned above, two (cancer due to exposure to sunlight, and death from carbon tetrachloride) have been written up for publication in the near future. The cases of hemoglobinuria will be included in a histological study of that subject.

LABORATORY REPORT OF TELA HOSPITAL

H. C. CLARK, M.D.

AUTOPSY EXAMINATIONS

Typhoid fever, perforation of an ulcer, peritonitis	1
Typhoid fever, lobar pneumonia, tertiary syphilis	1
Malarial fever, estivo-autumnal; broncho-pneumonia, otitis media	1
Malarial fever, estivo-autumnal, and hemoglobinuric fever	2
Malarial fever, estivo-autumnal	3
Malarial fever, estivo-autumnal and tertian	1
Malarial fever, estivo-autumnal and tertian; bacillary dysentery; tubercu- losis of the lungs; miscarriage at seventh month	1
Dysentery, bacillary	1
Dysentery, amebic; perforation rectal ulcer, peritonitis	1
Acute infectious jaundice, B. coli pyonephritis and septicemia	1
Pyemia and septicemia (streptococcus hemolyticus)	1
Abscess of tooth and jaw, osteomyelitis, pyemia (staphylococcus)	1
Alveolar and tonsillar abscess, septicemia and pyemia	1
Phlegmonous ulceration chest, right and left; estivo-autumnal malarial fever; tertiary syphilis	1
Furunculosis wrist, septicemia (staphylococcus)	1
Tetanus and extensive jigger-bite wounds, feet and hands	1
Tetanus and axe wound, left great toe	1
Tuberculosis of the lungs	1
Disseminated tuberculosis, acute and chronic	2

Syphilis, tertiary (cerebral softening, aortitis, nephritis)	1
Syphilis, tertiary (cerebral softening, aortic endocarditis, aortitis)	2
Syphilis, tertiary (rupture of an aortic aneurysm)	1
Cancer of the stomach	1
Anemia, severe secondary, degenerative myocarditis and dilatation	1
Purpura hemorrhagica and bacillary dysentery	1
Pneumococcic meningitis, hemoglobinuria, estivo-autumnal malaria	1
Pneumococcic meningitis and arthritis—sinusitis	1
Pneumococcic meningitis and abscess of a tonsil	1
Myocarditis, degenerative, mural thrombosis, embolism, cachexia	1
Bronchiectasis, chronic, emphysema lungs, dilatation of heart	1
Lobar pneumonia (with no complication)	2
Lobar pneumonia, pneumococcic meningitis	4
Lobar pneumonia, pneumococcic pericarditis	2
Lobar pneumonia, pneumococcic pericarditis, meningitis, peritonitis	1
Lobar pneumonia, pneumococcic meningitis, pericarditis, endocarditis, pulmonic and mitral	1
Lobar pneumonia, pneumococcic arthritis, balantidic dysentery	1
Lobar pneumonia, sinusitis, otitis media, mastoiditis	2
Lobar pneumonia, pneumococcic pericarditis and sinusitis	1
Lobar pneumonia, pneumococcic meningitis and sinusitis	1
Proctitis and sigmoiditis, chronic ulcerative, peritonitis, thrombophlebitis pelvic veins	1
Chronic nephritis, hypertrophy and dilatation left heart	1
Puerperal metritis, salpingitis, peritonitis—streptococcic	1
Fetus, death of. Stillbirth, seventh month. Malaria and syphilis in mother	1
Fetus, death of, at fifth month. Torsion, severe, of cord at placenta	1
Fetus—premature and stillbirth. Premature detachment placenta	1
Arthritis, pneumococcic (terminal pneumococcic meningitis, sinusitis and otitis media)	1
Arthritis, staphylococcic (septicemia)	1
Icterus neonatorum, premature birth, malaria in mother	1
Gunshot wound of the head	1
Gunshot wound of the chest, tertiary syphilis	1
Railroad traumatism, accidental	1
Railroad traumatism to foot—gas gangrene	1
Machete wounds (cutting) of shoulder, chest and hand	1
Ill-defined (perhaps poisoning by self-administered vermifuge for tape-worm— <i>T. solium</i>)	1

(Excluding 3 stillbirths, there were 63 complete autopsies performed;

therefore, 60 per cent of the deaths which occurred in the hospital were investigated at autopsy.)

SURGICAL PATHOLOGY

(Specimens Received and Microscopic Report Rendered)

Appendices	48
Curretage, uterine	20
Fundus uteri and appendages	6
Fallopian tubes	17
Ovaries	8
Cervix, specimen from	3
Specimen from female genitals, external	1
Specimens passed from uterine cavity	7
Specimens from male genitals, external	2
Testicle and epididymis	2
Tonsils (pairs)	9
Adenoids	1
Specimens from skin of ear	3
Specimens from skin of nose	3
Specimens from skin of face	6
Specimens from skin of back	1
Specimens from skin of scalp	4
Specimens from skin of groin and perineum	2
Specimens from skin (source unstated)	2
Specimens from leg ulcers	14
Specimen from lip	1
Lymph nodes	7
Specimen from tongue	1
Specimen from lower jaw	1
Thyroid gland	1
Gallstones	1
Submaxillary gland	1
Stomach, pylorus	2
Omentum, specimen excised from	1
Growth from thigh muscles	1
Growth from leg and foot	1
Bone, specimen from tibia	1
Calculus from bladder	1
Specimens from autopsy tissue sets received	2

CHIEF FINDINGS, OTHER THAN INFLAMMATORY, FROM SURGICAL SPECIMENS

Giant cell sarcoma of the lower jaw	1
Sarcoma of the foot and leg	1
Epidermoid carcinoma of the cervix	1
Epithelioma of the penis	1
Papillo-epithelioma of the face	1
Papillo-epithelioma of the nose	1
Epithelioma of the lip	1
Hodgkin's disease (autopsy tissue set)	1
Lipoma myxomatodes of the leg (autopsy tissue set)	1
Dermoid cysts of the ovary	2
Fibromyomata uteri	5
Polyp of the endometrium	1
Colloid goiter	1
Fibrolipoma of spermatic cord, testicle and epididymis	1
Lipoma of the thigh	1
Hemangioma simplex of the back	1
Cutaneous horn, malar region	1
Sebaceous cysts	3
Papillomata of the anal and vulvar tissues	1
Papillomata of the face	3
Papilloma of the tongue	1
Dermatomyoma of the ear, with a keloid base	1
Oriental sore of the ear	1
Granuloma inguinale	1
Tuberculosis of the peritoneum of an appendix	1

BACTERIOLOGICAL REPORT

Blood cultures (ante mortem)	41
Stool cultures	43
Urine cultures	16
Spinal fluid cultures	11
Pus from joints	7
Pus from skin lesions	10
Pleural fluid	3
Pus from abscess, abdominal wall	2
Pus from conjunctival sac	2
Pus from machête wound of skull and brain	1
Water samples	14

Urine sediment (positive for the tubercle bacillus)	1
Autogenous vaccines prepared	10

The chief findings by culture were the following:

BLOOD CULTURES:

Positive for <i>B. typhosus</i>	7
Positive for the staphylococcus	4
Positive for non-hemolytic streptococcus	1
Positive for hemolytic streptococcus	1

STOOL CULTURES:

Positive for <i>B. dysenteriae</i>	11
Positive for <i>B. typhosus</i>	1

URINE CULTURES:

Positive for <i>B. coli</i>	5
Positive for <i>B. typhosus</i>	1

SPINAL FLUID:

Positive for pneumococcus	5
Positive sediment for tubercle bacillus	1

PUS FROM JOINTS:

Positive for pneumococcus	2
Positive for streptococcus	2
Positive for staphylococcus	1
Smears positive for gonococcus	2
(Cultures taken at autopsy, not analyzed.)	

SEROLOGICAL REPORT

Wassermann tests performed	1,535
Widal tests	13
Dysentery agglutinations	21

MISCELLANEOUS WORK

Placental films (8 positive for malaria)	44
Dark-field examinations (syphilis, 8; yaws, 3)	42
Smears from prostatic massage	14
Smears from skin lesions (special)	4
Throat smears	3
Eye smears (special)	4

Sugar determination in blood	1
Sugar determination in urine	3
Stomach contents, analysis of	1

VETERINARY WORK

Chickens autopsied	12
Turkeys autopsied	2
Cattle autopsied	9
Mules and horses autopsied	3
Small animals and fowls autopsied, in addition	16
Hog autopsied	1
Tissues examined	8
Blood films examined	6
Cultures from spleens	2
Other miscellaneous examinations	10

CHIEF FINDINGS:

Texas cattle fever (piroplasmosis) in imported red-pole stock.

Equine piroplasmosis in a pony.

One case of anthrax, and one of glanders, in mules.

Hog-meat infestation by *cysticercus cellulosæ* and *Stephanurus dentatus*.

Avian diphtheria.

Chicken favus.

Infestation of chickens by the tick, *Argus miniatus*.

SOME GENERAL REMARKS

In the hospital service the main diseases that claimed the attention of the laboratory during the year were the following:

Malaria; helminthiasis; syphilis; lobar pneumonia and other pneumococcus infections; infections complicating gunshot, machête and other wounds; the various forms of dysentery, typhoid fever and tuberculosis.

There was a striking absence of relapsing fever, leprosy, smallpox, diphtheria and the epidemic form of meningitis. Malignant tumors were seldom encountered, either in the surgical tissues or at autopsy, and when found they occurred in foreigners or in individuals of mixed race. Sarcoma was found in a young male native; and there was one instance of cancer of the stomach, in an old male Jamaican negro.

TYPHOID FEVER

This disease is not common. It appears sporadically, rather than in epidemic form.

TUBERCULOSIS

The incidence of this disease does not appear to be as serious a factor in the labor camps as it is in the coast port towns.

DYSENTERY

Considering the type of the labor forces, and the way in which individuals live in close contact with one another in the camps, the number of dysentery cases is comparatively small.

One case of amebic dysentery (chronic) was followed by a perforation of an ulcer in the sigmoid and rectal region of the colon, resulting in a general peritonitis. There were no other serious complications, as for example, liver abscesses.

Bacillary dysentery was found to be present, but not in a marked degree. The Shiga-Kruse type was found in a few cases, but the Hiss-Russell and Y types are the most common.

Balantidic dysentery was found at autopsy, associated with lobar pneumonia, in one case.

Our group of unqualified types of dysentery, probably, is chiefly composed of the bacillary form of the disease. Laboratory conditions were not favorable throughout the year for a satisfactory culture study of this group.

GUNSHOT, MACHÊTE AND OTHER TYPES OF WOUNDS

These resulted in a very small rate of general infections of the ordinary type. Tetanus has a surprisingly low incidence, considering the number of "injury cases" treated. There was one instance of gas gangrene.

SYPHILIS

This disease is seldom included in morbidity and mortality statistics. There appears to be a universal habit to avoid mentioning the disease, and to name in its place the latest and most important lesion resulting from it.

Our autopsy, serological and dark-field examinations all show that the prevalence of syphilis is just as serious where we carry on our work as it is in other parts of the world.

PNEUMOCOCCUS INFECTIONS

The rapidly shifting labor force is largely composed of adult, male, Spanish-Indians. Coming, as they do, from the high rural regions of the country to work in a low coastal plain, they face conditions under which they are peculiarly liable to contract respiratory diseases. Acute respiratory disease is far more serious with these men than with foreign white races. The same thing happens here, with regard to lobar pneumonia and other pneumococcic infections, that has

always been known to happen along the coastal plains of Central and South America. When mountain natives are brought down in large numbers for military duty on the coast, lobar pneumonia may appear in almost epidemic form, and with a high rate of mortality. Pneumonia was one of the principal diseases to be considered by General Gorgas and the American Commission which was sent to the mines in South Africa to report on the causes of the high mortality occurring among the laborers in those mines. Darling, in his report* of this investigation, writes as follows:

"Pneumonia is a very serious disease there because it takes the men off chiefly during the first six months of their service; after six months, pneumonia occupies a more normal place in the death rate, and this has been our experience here on the Isthmus. In 1905 and 1906, when we brought large numbers of laborers here from the West Indies, pneumonia was practically epidemic. Now its place is 'normal' among the death rates and has been since 1908."

Our labor force is constantly changing, but the replacement involves always the same class of native workers. These people have relatively little resistance to the pneumococcus. Note in our Autopsy Examinations report (page 134), how few of these cases of lobar pneumonia examined at autopsy failed to show a pneumococcic extension to some one or more regions outside the respiratory tract.

HELMINTHIASIS AND MALARIA

It is very difficult to form any clear idea of the incidence of these disorders merely by reading the total results of laboratory examinations on stools and blood for the month or the year, because the same individual will undergo many examinations. It is likewise difficult to obtain from the morbidity reports a true knowledge of these diseases, since in regard to any one patient only one disease can be mentioned on such records, notwithstanding the fact that at the same time the patient may be suffering from more than one disease. For these reasons the laboratory has taken the opportunity, during the past two months, to review the clinical records of twelve months. The month of December, 1922, and the first eleven months of 1923 were chosen for the analysis. Case histories of newly born children, and of individuals who did not remain in the hospital long enough to get a stool and blood examination recorded, are not included. Case histories with the diagnosis of "clinical malaria" in which the laboratory did not find parasites are also excluded from the list of positive cases of malaria. This means that there remain 3,264 case histories, or hospital admissions, for the indicated twelve-month period during which the laboratory recorded one or more examinations of the stool and the blood.

*Proc. Med. Assoc. Isth. C. Z., Vol. VII, Part I, page 10.

HELMINTHIASIS

Stools are subjected to the same kind of examination that is used by the Rockefeller Foundation International Health Board Laboratory. In addition, special methods for revealing ameba are employed. This subject will be summarized below in tabular form:

INHABITANTS EXAMINED

	Cases Examined	Positive	Per Cent
Tela Railroad Company employees	2,417	1,555	64.3
Non-employees	847	427	50.4

INCIDENCE BY COMBINATIONS

Uncinaria, alone	727
Uncinaria and trichuris trichiura	274
Trichuris trichiura, alone	247
Ascaris	236
Uncinaria and ascaris	167
Uncinaria, ascaris and trichuris trichiura	135
Ascaris and trichuris trichiura	95
Tapeworms	8
Uncinaria and oxyuris vermicularis	2
Strongyloides	2
Uncinaria, ascaris, trichuris, strongyloides	1
Uncinaria, trichuris, strongyloides	1
Ascaris and strongyloides	1
Trichuris and strongyloides	1
Uncinaria, strongyloides, oxyuris vermicularis	1
Uncinaria and strongyloides	1
Oxyuris vermicularis	1
Tapeworm, uncinaria, ascaris	1
Tapeworm, trichuris, ascaris	1
Entameba histolytica	62
Entameba coli	5
Balantidium coli	2
Flagellates (without reference to combinations)	11

INCIDENCE WITHOUT REGARD TO COMBINATIONS

	Positive Cases	Total Rate Per Cent
Uncinaria	1,310	40.1
Trichuris trichiura	755	23.1
Ascaris	637	19.5
Tapeworms	10	.30
Strongyloides	8	.24
Oxyuris vermicularis	4	.12
Entameba histolytica	62	1.9
Entameba coli	5	.15
Balantidium coli	2	.06
Flagellates	11	.34

The tapeworms were: *T. saginata*, 9; *T. solium*, 1.

During the 12 months, 112 individuals were admitted twice and treated for intestinal parasites; 17 persons were admitted 3 times, and 2 persons 4 times, for similar treatment.

All of the 658 persons showing intestinal parasites of some kind also had malarial parasites in their blood films.

INCIDENCE AT AUTOPSY
(60 Cases Examined)

	Cases	Total Rate Per Cent
Uncinaria, trichuris, ascaris.	18	
Uncinaria, trichuris	12	
Ascaris.	8	
Uncinaria.	3	
Trichuris.	3	
Ascaris, trichuris	3	
Uncinaria, ascaris	2	
Tapeworm (T. solium).	1	
	50	83.3

INDIVIDUAL PARASITIC RATE

	Per Cent
Trichuris	60
Uncinaria	58.3
Ascaris	51.6

Our morbidity records contain many primary diagnoses of "uncinariasis," but very few of them were considered serious cases of "hookworm anemia" with its usual sequelæ. In fact, the disease probably plays a minor rôle as to undermining the efficiency of the labor force, in comparison to the part played by malaria.

MALARIAL FEVER AND HEMOGLOBINURIC FEVER

Malarial fever, with its clinical manifestation, is without doubt our most important disease. It seriously affects the efficiency of the labor force, and presents to the Medical Department many difficult problems. It will be tabulated in rather more detail in order to present certain features that may be of business importance.

SEASONAL INCIDENCE

The disease occurs throughout the year, but it constitutes the greatest problem during the period of August to January inclusive. The explanation is in the fact that these are the months of heaviest rainfall. Here, again, the summary is presented in statistical form:

INHABITANTS EXAMINED

	Cases Examined	Positives	Per Cent Positive
Tela Railroad Company employees . . .	2,417	829	34.29
Non-employees	847	202	23.84

RACES			
	Cases Examined	Positives	Per Cent Positive
Latin-Americans	2,685	899	33.4
Negroes	240	53	22.0
Americans, English, etc.	333	78	23.4
Chinese	6	1	16.0
Totals	3,264	1,031	31.5

AGES			
	Cases Examined	Positives	Per Cent Positive
Under 5 years of age	104	33	31.7
5 years, and under 10 years	36	14	38.8
10 years, and under 15 years	51	17	33.3
15 years, and under 25 years	1,585	623	39.3
25 years, and under 35 years	934	227	24.3
35 years, and under 45 years	342	80	23.3
45 years, and under 55 years	160	29	18.1
55 years and over	52	8	15.3

SEX			
Males	2,611	881	33.7
Females	653	150	23.

(Females and children in labor camps show a higher rate than the men.)

TYPES OF MALARIA FOUND			
	Primary Cause of Illness	Secondary Cause	Total Rate
Estivo-autumnal	453	72	525
Tertian	325	78	403
Quartan	25	3	28
Estivo-autumnal and tertian	66	6	72
Estivo-autumnal and quartan	1	—	1
Tertian and quartan	1	—	1
Estivo-autumnal, tertian, quartan	1	—	1
Totals	872	159	1,031

TYPE OF TOTALS, WITHOUT REGARD TO COMBINATIONS

Estivo-autumnal	599 cases, or 58 per cent of the 1,031 positive cases
Tertian	477 cases, or 46 per cent of the 1,031 positive cases
Quartan	31 cases, or 3 per cent of the 1,031 positive cases

DURATION OF HOSPITAL STAY

Nine hundred eleven of the cases show an average stay, for treatment, of 6.21 days.

One hundred twenty of the cases show an average stay of from 16 to 56 days. These were either associated with some sequel of malaria or had associated one or more other diseases.

The cases that were in the hospital for simple "hookworm treatment" averaged 4.5 days.

Treatment: The average cases of malarial fever received about 240 grains of quinine, by mouth. Severe cases, unable to take or to retain the drug, averaged two hypodermic treatments of 22.5 grains each.

READMISSIONS FOR MALARIA

Fifty-two persons were admitted twice during the year.

Seven persons were admitted three times during the year.

All of these were natives, with the exception of three citizens of the United States.

Hospital mortality during the year consisted of 19 deaths due to malaria or hemoglobinuric fever. This is equivalent to a percentage of 1.84.

DISTRICT DISTRIBUTION OF MALARIA

	Cases Examined	Positives	Per Cent Positives
Progreso	422	170	40.2
Colorado	622	245	39.3
Fortuna	373	136	36.4
Urraco	108	34	31.4
Tela	1,076	312	29.
Uhua	241	64	26.5
Guimas	265	53	20.
Miscellaneous*	157	17	10.8

*San Pedro Sula, Ceiba and a few other towns represent most of this list of district distribution.

INCIDENCE OF MALARIA AT AUTOPSY

The autopsy offers an opportunity to examine the bone marrow and the spleen for parasites and pigment, and gives a much more accurate idea of acute and latent malaria than any ante-mortem method can furnish.

There were 54 Latin-Americans, 4 negroes and 2 Americans in the series; 11 cases evidenced an acute manifestation of the disease; 14 cases showed what might be called latent malaria, and they might be termed "carriers" of parasites—a percentage of 41.6.

The spleens of all adults were weighed, and revealed a range in weight from 120 grams to 1,730 grams.

The average weight was 530 grams. A normal spleen weighs 150 to 200 grams in an average man. A chronic splenomegaly is the rule here.

SOME MALARIA SURVEYS

These have nothing to do with hospital cases. The surveys represent examinations, at different times during the year, of groups of people employed at their daily routine. The ordinary thin film was used in making the survey, but a long searching interval was allowed in each instance. As a rule, three people searched every film. The port town of Tela, three schools and two large labor

camps were selected, in order that it might be ascertained how much malaria there might be among the inhabitants who were not under hospital or dispensary treatment. The following surveys, therefore, are submitted as indicating the probable incidence of malaria throughout the Division.

	Per Cent Positive
Puerto Arturo surveyed January 13, 1923 (Truck garden and dairy farm):	
Men, women and children (111)	63
Nevada Farm, June 5, 1923:	
Men, women and children (105)	37
Old Tela military and prisoners, September 29, 1923:	
Men (100)	14
Old Tela school, November 24, 1923:	
Children and teachers (57)	14
New Tela school, December 20, 1923:	
American children and teachers (46)	4.3
New Tela school, December 20, 1923:	
Negro children and teachers (41)	7.3
Birrichichi Plantation—Garcia's, November 5, 1923:	
Men, women and children	5.4

TYPES OF PARASITES FOUND IN SURVEYS

	Cases
Tertian	86
Estivo-autumnal	37
Quartan	10
Mixed estivo-autumnal and tertian	6

SEX INCIDENCE AND SURVEYS

Labor camp, Puerto Arturo	Males positive in 60 per cent, and females 70 per cent
Labor camp, Nevada	Males positive in 35 per cent, and females 39 per cent
Children	Positive in 40 per cent

CAMP HEMOGLOBIN INDEX

This was taken in the camp at Puerto Arturo. The range was 30 to 90 per cent, with an average of 70 per cent.

A CAMP DIFFERENTIAL COUNT OF LEUCOCYTES

This was obtained from the 105 people in the Nevada Camp. The results were as follows:

	Average	Range, Per Cent
Polynuclear neutrophiles	41 plus	8 to 72
Large mononuclear cells	2 plus	0 to 9
Lymphocytes	40 plus	19 to 72
Transition forms	2 plus	0 to 9
Eosinophiles	10 plus	1 to 46

Basophiles and undetermined cells were too small in number to analyze.

SUMMARY OF SURVEYS

(Incidence of malaria, by four methods)

	Per Cent
Autopsies (acute and latent cases) (60 examined)	41.6
Hospital admissions (3,264)	31.5
Labor camps, schools, etc. (534 persons)	26.2
Placental films examined (44 cases)	18.1

REMARKS

Malaria frequently appears as a complication during the course of other diseases. A latent malaria can suddenly become acute when other diseases, or external violence, may lower the patient's vitality. It frequently causes a striking change in the clinical picture of a surgical or obstetrical case, and may lead to considerable confusion for a time in the efforts to learn whether an inflammatory sequel or a malarial paroxysm is present.

It is probable that the occasional severe cases of anemia, which simulate pernicious anemia, may be related to long standing malarial cachexia. The same is probably to be thought of in connection with purpura as it occurs here.

A SURVEY AT TELA HOSPITAL TO DETERMINE SYPHILIS

DR. H. C. CLARK

The north coast of Honduras is a coastal plain with but four or five towns, ranging in population from a few hundreds to a few thousands. The greatest industry on the coast is fruit-growing, under the direction of two or three large foreign companies, which employ native labor drawn from all parts of Spanish Honduras and the neighboring countries. A certain amount of West Indian negro labor is used, in addition, for dock, village and farm duties. The relatively small administrative force is composed chiefly of white people from the United States and England. The population of this region, therefore, is largely made up of young native male adults, whose life is rural as regards both their place of employment and their place of residence.

There has never been an institution on this coast with laboratory facilities adequate for the study of the local index of syphilis. Although the greater number of their patients come from the more densely populated centers, and are business individuals able to meet the expense of examination and treatment, most of the physicians of the larger towns have only an indefinite idea as to the prevalence of the disease. This naturally means that there is available very little information concerning the general prevalence of the disease in the community.

From November 14, 1922, to the end of September, 1923, we have examined approximately half the admissions to Tela Hospital by the Noguchi modified method of the Wassermann test, in order to gain a more concrete idea of the index of syphilis among the employees of the Tela Railroad Company and among the neighboring inhabitants. There is, of course, some liability of error in such a small survey conducted by this means, but current opinion strongly endorses the value of this particular test in general surveys of this kind. A recent editorial

comment in the *Journal of the American Medical Association* (1) concludes its remarks with the following statement: "It cannot be said at this time that a positive Wassermann test is obtained only in syphilitic infection, but the trend of recent investigation is very strongly in that direction." Craig's (2) long experience with the test (over 50,000 applications) leads him to the following conclusion: "The day has passed when clinical evidence alone is to be considered as sufficient upon which to base figures regarding the prevalence of syphilis in a community or country. The cases of syphilitic infections that are apparently without clinical symptoms far outnumber those that present typical symptoms." Personally, I believe that the long experience with the Wassermann test at the Board of Health Laboratory, Ancon, Canal Zone, fully confirms his view.

Because of routine laboratory demands in other lines, we have not been prepared to test all admissions to this Hospital and all visitors to the dispensary during this survey; 1,126 hospital admissions and 308 dispensary cases were examined from one to six times. The total number of hospital admissions during this period was 2,974. Considering the number of readmissions, to the hospital, of the same individuals during that time, and the number of dispensary cases who were not admitted, it seems safe to conclude that we have examined about half of the hospital service during this investigation. The 308 dispensary cases examined included suspected syphilitics and chronic obscure conditions, while four fifths of the hospital cases were non-suspects from the standpoint of their clinical history and physical examination.

COMPLEMENT FIXATION TEST EMPLOYED

For the sake of having parallel conditions with which to compare our results, and because of my long association with the method used by Dr. L. B. Bates of the Board of Health Laboratory, Panama Canal, I have been led to adopt his technique in performing the test. It is a modification of the Noguchi method, and is almost the duplicate of Craig's test in its technic and its designations in the reading of the test. A complete, detailed account of the test (3) as we use it at Tela has been forwarded to the Office of the Medical Director within the last few months, but it may be well to make here special mention of certain features connected with our method:

- (a) The human hemolytic system was used.
- (b) The antigens employed were half-saturated cholesterolized alcoholic extracts of the human heart.
- (c) The complement was derived from guinea pigs shipped from the United States; the serum was taken from the pigs on the day before each group test, and kept on ice until used.
- (d) The amboceptors were made at the Board of Health Laboratory of

the Panama Canal, or were selections from four that were made here in our laboratory. The rabbits used came from the United States.

- (e) The human sera to be tested were taken, as a rule, the day before each group test. They were kept on ice until the morning of the test, and then inactivated in a water bath at 56 C. for thirty minutes.
- (f) The amboceptor and the complement, as well as the salt solution and the human red cells to be used in each group test, were titrated in the usual way before each application of the test.
- (g) Controls were used in each batch tested.
- (h) The first hour's incubation was in dry heat at 37.5 C., and the racks were shaken every fifteen minutes.

The second period of incubation (after addition of red cells and amboceptor) was in dry heat at 37.5 C., but this period of incubation continued only until the reaction in the control sera tubes was complete. The time required might range from twenty minutes to an hour, according to the strength of the amboceptor used. The racks were shaken every five to ten minutes.

- (i) Each batch of sera tested was always given a double test — that is, either two antigens were employed against a control tube, or two complete sets of racks were used with a Canal Zone antigen and an amboceptor in one set of racks, and an antigen and an amboceptor of local make in the other set.
- (j) All tubes in the racks were placed in a centrifuge at high speed after the completion of the incubation period, in order to gain as clear an idea as possible regarding the amount of hemolysis or inhibition of hemolysis.
- (k) The same designations were used in recording the result of the test as are employed by Craig (4) and by Bates.

A double plus sign (++) indicates absolute inhibition of hemolysis or a positive reaction. It represents a positive diagnosis of syphilitic infection. A single plus sign (+) indicates anything between absolute inhibition and 50 per cent inhibition of hemolysis, a doubtful reaction and diagnosis, unless supported by a history and some clinical facts. A plus-minus sign (+—) indicates anything between 50 per cent inhibition of hemolysis and total hemolysis. This should be considered negative, unless in the case of an individual undergoing treatment; or in an individual with a genital sore of questionable character. In the latter cases it only indicates repeating the test at a later date, and should indicate a dark-field examination of the sore. A minus sign (—) indicates complete hemolysis or a negative reaction.

- (1) A provocative test was applied in the case of two individuals.

This investigation was not intended to show how many individuals were admitted to Tela Hospital or visited its dispensary as a primary result of their syphilitic infection. The primary object was to learn the prevalence of the disease

in the community, and then to analyze any facts found recorded in the histories of the individuals.

A total of 1,434 persons were tested by us; 1,234 were males, and 200 were females.

The total incidence of positive reactions (++) was 14.7 per cent, and of doubtful reactions (+) 7.5 per cent, or a combined result of 22.2 per cent. The tabulated results of the investigation follow:

	SEX		Percentage Doubtful (+)	Combined (++ and +)
		Positives (++)		
Males		14.6	7.8	22.4
Females		15.0	5.0	20.0

	AGES			
	Cases Tested	Positives (++)	Percentage Doubtful (+)	Combined (++ and +)
Under 2 years of age.	5	20.0	—	20.0
2 years, and under 10 years.	8	12.5	12.5	25.0
10 years, and under 15 years	11	18.1	9.0	27.1
15 years, and under 20 years	208	9.6	3.8	13.4
20 years, and under 30 years	679	13.8	7.8	21.6
30 years, and under 50 years	446	18.6	8.9	27.5
50 years, and over.	77	12.9	6.4	19.3

LOCATION OF RESIDENCE AND EMPLOYMENT

	Cases Tested	Positives (++)	Doubtful (+)	Combined (++ and +)
Rurals	790	108 (13.6%)	50 (6.3%)	158 (19.9%)
City or village	644	103 (16%)	58 (9%)	161 (25%)

DISPENSARY VISITORS VS. HOSPITAL PATIENTS

	Cases Tested	Positives (++)	Doubtful (+)	Combined (++ and +)
Dispensary	308	61 (19.8%)	32 (10.3%)	93 (30.1%)
Hospital.	1,126	150 (13.3%)	76 (6.7%)	226 (20%)

Many of the patients tested had a clinical record showing more than one disease under treatment, and several of them had numerous entries in the list of their clinical diagnoses. Irrespective of how many diseases coexisted in the people examined, and of the need for repeating the entries under ++ and + columns, the entire list of all diagnoses recorded will be arranged according to the form sheets for the Classification of Diseases. The frequency of a double-plus or single-plus reaction will run in parallel columns. This method will afford an opportunity to observe and discuss the coexistence of diseases, and to discern any possible effect they might produce or be suspected of producing on the result of the Wassermann test.

CLASSIFICATION OF DISEASES ENCOUNTERED

ENDEMIC OR INFECTIOUS DISEASES

Entries in series	Number Tested	Times (++) Coexisted	Times (+) Coexisted	Combined Per Cent (++ and +)
1. Typhoid fever	5	—	—	—
5a. Malarial fever, estivo-autumnal. . .	150	15	1	10.6
5b. Malarial fever, tertian.	123	17	9	21.1
5c. Malarial fever, quartan	7	—	—	—
5d. Malarial fever, quartan and E.-A..	2	—	1	50.0
5d. Malarial fever, quartan and tertian	1	—	—	—
5d. Malarial fever, E.-A. and tertian .	26	1	—	3.8
5d. Malarial fever, clinical.	64	3	5	12.5
5f. Malarial fever cachexia	2	—	—	—
5g. Malarial fever, hemoglobinuric . . .	1	—	—	—
11. Influenza	10	—	—	—
16a. Dysentery, amebic	15	—	1	6.6
16b. Dysentery, bacillary.	1	—	—	—
16c. Dysentery, unspecified.	22	—	—	—
21. Erysipelas	1	—	—	—
25e. Yaws	10	6	1	70.0
26. Purulent infection, septicemia . . .	3	—	1	33.3
30. Tetanus	1	—	—	—
32. Tuberculosis of the lungs.	16	—	1	6.2
35. Tuberculosis of the spine.	2	—	—	—
39. Syphilis (any period or kind). . . .	140	70	25	68.0
40. Chancroids, lymphadenitis, etc.. .	27	9	1	37.0
41. Gonorrhea (eye lesion excepted) . .	19	1	—	5.2
42. Gonorrheal ophthalmia	5	—	—	—

GENERAL DISEASES NOT INCLUDED ABOVE

49. Sarcoma of foot and leg	1	—	—	—
50d. Tumor of bladder.	1	—	—	—
50f. Lipoma of the thigh.	1	—	—	—
51 and 52. Arthritis, rheumatism. . . .	42	16	9	59.5
54. Pellagra	1	—	—	—
56. Rickets	1	—	—	—
58. Anemia, chlorosis, etc..	9	3	—	33.3
64. Diseases of the spleen	5	—	—	—
66. Alcoholism.	1	—	1	100.0
69e. Purpura hemorrhagica.	1	—	—	—

DISEASES OF NERVOUS SYSTEM—ORGANS OF SPECIAL SENSE

74b. Cerebral embolism and thrombosis	1	—	—	—
75. Paralysis, cause unspecified.	2	—	1	50.0
77. Insanity.	1	1	—	100.0
78. Epilepsy.	5	—	—	—
81b. Hysteria.	2	—	—	—
81c. Neuritis	2	—	—	—
84. Diseases of the eye	34	7	3	29.0
85. Diseases of the ear	9	—	—	—

DISEASES OF CIRCULATORY SYSTEM

	Number Tested	Times (+) Coexisted	Times (+) Coexisted	Combined Per Cent (+ + and +)
89. Chronic heart disease	23	5	—	21.7
90. Aneurysm	2	1	—	50.0
91. Arteriosclerosis	1	—	—	—
93. Hemorrhoids	3	—	—	—
94. Chronic lymphadenitis	57	21	3	42.1

DISEASES OF RESPIRATORY SYSTEM

97. Laryngitis	2	—	—	—
98. Bronchitis	14	—	—	—
99. Broncho-pneumonia	3	—	—	—
100. Lobar pneumonia	10	—	—	—
101. Pleurisy	4	—	—	—
104. Asthma	2	—	—	—
106. Unresolved pneumonia	2	1	1	100.0

DISEASES OF DIGESTIVE SYSTEM

107. Diseases of mouth, adnexa	8	—	—	—
108. Tonsillitis	6	1	—	16.6
110b. Duodenal ulcer	1	—	—	—
111b. Gastritis	1	—	—	—
114. Ankylostomiasis	360	56	12	18.8
115a. Cestodes	3	—	—	—
115d. Ascariasis	243	33	4	15.2
115e. Trichocephalus	236	32	9	17.3
115f. Oxyuris vermicularis	6	—	—	—
115g. Balantidium coli	1	—	—	—
115f. Strongyloides	3	—	—	—
116. Appendicitis	4	—	1	25.0
117. Hernia inguinal	5	—	—	—
118. Other diseases of intestines	9	3	—	33.3
122. Gallstones	1	—	—	—
123. Other diseases of liver	12	4	—	33.3
126. Constipation	3	—	—	—

NON-VENEREAL DISEASES OF GENITO-URINARY SYSTEM

128. Chronic nephritis	14	3	—	21.4
130. Pyelitis	3	1	—	33.3
133a. Urethral stricture	4	—	—	—
134. Prostatic abscess	2	—	—	—
135. Other diseases of the genito-urinary system	6	—	—	—
136. Cyst of the ovary	2	—	—	—
137. Salpingitis, etc.; metritis	10	2	—	20.0
138. Benign tumor of uterus	6	—	—	—
141. Other diseases of female genito-urinary system	10	2	—	20.0
142. Mastitis	1	1	—	100.0

THE PUERPERAL STATE

	Number Tested	Times (++) Coexisted	Times (+) Coexisted	Combined Per Cent (++ and +)
143a. Abortions	10	4	—	40.0
143c. Cord prolapsus, placenta previa . .	2	—	—	—
148. Eclampsia	2	—	—	—
149. Childbirth	9	—	—	—

DISEASES OF SKIN OR CELLULAR TISSUES

151. Gangrene	1	—	—	—
152. Furuncles, carbuncles, etc.	5	1	2	60.0
153. Phlegmon, acute abscess	15	—	—	—
154. Tinea and alopecia	1	—	1	100.0
155b. Scabies	6	—	—	—
155c. Chiggers	2	—	—	—
155i. Elephantiasis	1	—	—	—
155m. Leg ulcer	77	11	6	22.2
155o. Ulcerating granuloma inguinale . .	3	0	—	—
155p. Impetigo contagiosa	1	1	—	100.0
155r. Leishmaniosis (oriental sore) . . .	1	—	—	—
155r. Other skin diseases	20	6	2	40.0

DISEASES OF BONES AND ORGANS OF LOCOMOTION

156. Periosteitis	6	3	1	66.0
Sacral bony mass	2	2	—	100.0
Harelip	1	—	—	—
Bone pains, obscure	10	5	—	50.0

DISEASES OF EARLY INFANCY

160. Icterus	1	—	—	—
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EXTERNAL CAUSES

169. Burns, second degree	1	—	—	—
173. Gunshot wounds	12	2	—	16.6
174. Machête and axe wounds, stabs, etc. .	36	3	—	8.3
175. Injury by fall—diving	1	—	—	—
177. Railroad traumatism	4	—	—	—
178. Snake-bite	1	—	—	—
188. Dislocation costal cartilages	1	—	—	—
189. Sprained ankle	1	—	—	—
190. Fracture caused by some agent . . .	7	1	—	14.2
191e. Other external violence	20	3	—	15.0

ILL-DEFINED DISEASES

193. Ill-defined disease, usually dispen- sary cases and unstated diagnoses . . .	57	10	3	22.8
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GENERAL REMARKS

TABLE OF THE RACES

	Number Tested	Positive (++)	Doubtful (+)	Combined Per Cent (Probable Syphilis)
Negroes and mulattoes	200	52 (26%)	18 (9%)	35%
Latin-Americans	1,113	147 (13.2%)	75 (6.7%)	19.9%
North Americans and Eu- ropeans	104	10 (9.6%)	13 (12.5%)	22.1%
Syrians	14	2 (14.2%)	2 (14.2%)	28.4%
Chinese	3	—	—	—

Our index of syphilis among the negroes and mulattoes is very much the same as that of other countries. A 1916 report from the Panama Canal (5) gives a rate of 30 per cent, while Vedder's (6) report on the enlisted colored troops of the United States Army shows 36 per cent of probable syphilitics. The negroes in our survey consist of 122 West Indians, 70 British Hondurians, and 8 Caribs. These people are far more apt to be or to have been the victims of Yaws, a disease which can cause more confusion in the application of the Wassermann test than any other single disease in this subtropical region. Yet very little stress has been given this fact, apart from a few old reports from the Philippines, from the Panama Canal, and more recently by Sellards and Goodpasture (7). The percentage of syphilis is undoubtedly high among negroes, but it is quite likely that some of this rate can be justly attributed to Yaws. There are many tropical clinicians of short experience who even fail to identify a well-developed case of secondary Yaws. There are few physicians who will not have difficulty in recognizing very many cases in the primary and tertiary stages. No serious handicap can come from the failure to differentiate between these diseases, since the treatment is the same for both. The trouble confronts the epidemiologist more than any one else, for statistics on syphilis in tropical and subtropical islands and on coastal plains are certainly to some extent (perhaps to a large extent) invalidated by the unrecognized presence of Yaws.

We have been able to test only 104 members of the local white race, and most of these were clinical suspects or had some obscure chronic disease. It is believed that these facts explain why this race appears to show a higher rate than is justified for the white population of the entire community. The Panama Canal rate (8) is about 16 per cent for both civil and military populations. Several of these people were old cases of syphilis under treatment, and a few of them came from the Canal Zone where the diagnosis had been made some months previously. Our local general per cent of 22.1 is not outside the limits of such surveys for various parts of the United States. The Peter Bent Brigham Hospital (9) submits a rate of 15 per cent of all patients admitted, while the Bellevue Hospital (10) gives a rate of 25 per cent.

The Latin-American group was the largest tested, and more nearly repre-

sents an even distribution of the population, since very many non-suspects were tested. This group contained 1,113 people, and most of them were Hondurani-ans or Salvadoranians. All countries of Central America and most of those of South America had representatives in the group.

The Panama Canal rate (11) for a group of individuals that was similar (except that in Panama there were very few rurals in the list) gave a rate of 26 per cent. Our local rate of incidence for syphilis among these people in this region is 19.9 per cent, and it is probably not far from correct.

The Syrians and the Chinese formed too small a group to permit of discussion of the true incidence of the disease among these people.

SEX

The combined results, for all races, show very little difference in the rates between males and females. An analysis by race, however, shows that the bulk of positive females were found among the negroes and the Latin-Americans.

AGE

The vast majority of the people surveyed were between the ages of 15 and 50, and nearly half of these were between the ages of 20 and 30. Individuals outside this large group were in such small numbers that it would be unsafe to place much reliance on the rates indicated for them. It is plain, however, that the disease must be kept in mind, by the clinicians, for all ages of patients. The third, fourth and fifth decades of life are pretty well represented in the survey. The apex in the incidence of syphilis is more or less to be expected among people between the ages of 20 and 50 years. Our local rate was greatest between the years of 30 and 50.

LOCATION OF RESIDENCE AND PLACE OF EMPLOYMENT

Our force of employees can be somewhat roughly divided into a rural and a village, or headquarters, group, the latter to include all administrators associated with farm work. It was expected at the start of the survey that the rate for the rural labor force would fall very far below that for the rest of the force, but there proves to be a relatively small difference in favor of the rural population. Our labor force, speaking in a general way, is nomadic in character, shifting every few months. The younger men (15 to 20 years of age) are persons who probably have had little contact with the denser centers of population, including the port towns, until they joined the forces in our labor camps. It is therefore surprising to me to find their rate of incidence to be even as high as 13.4 per cent. The persons of the later decades of life are usually better prepared to make a living, and far more likely to seek employment and residence in or near towns.

It seems more likely that individuals of this class are surrounded with more danger of acquiring the disease. Our rural rate is another indication of how widely spread among all classes the disease really is.

DISPENSARY VISITORS VS. HOSPITAL PATIENTS

Syphilis, during its primary, secondary and early tertiary stages, is very likely to remain an "office" or "dispensary" case. As a rule, individuals do not seek hospital attention for the disease until its ravages have resulted in such extensive lesions that some organ or system has developed a disturbance in function. Usually so much time has elapsed that the patient does not associate with his present troubles syphilis acquired some months or even years ago. Many times the primary and secondary lesions have been so trifling in character that the person never has known that the disease was acquired. He is able to continue his daily routine of life. The average person seeks the office or dispensary because of some minor ailment which may be of an obscure nature, or which may relate to unexplained forms of bone pain and rheumatism, etc. For these reasons the application of the Wassermann test to certain classes of dispensary cases has been encouraged, in order that some idea may be gained as to the relative incidence of "hospital" and "dispensary" syphilitics. Our survey showed a three to two incidence in favor of the dispensary use of the test, and positive returns.

COEXISTENCE OF DISEASES IN CASES TESTED

It will be seen from the table of diseases charted that the people tested usually had more than one disease present. The most frequent coexistence encountered in this hospital during the survey consisted of some type of malarial fever and some combination of the intestinal parasites. It is, therefore, only natural to expect that syphilis would be frequently found associated with these diseases. Serologists unacquainted with tropical conditions might consider these diseases as possibly confusing features in the successful application of the Wassermann test. Some years ago it was more or less generally believed that malaria and several other diseases did interfere to a significant degree in the use of the test. During that period of time there were many laboratory workers who were not in a position to appreciate what the coexistence of diseases with the symptomless cases of syphilis meant; yet there are many such cases of syphilis which cannot be diagnosed without laboratory tests. This led to numerous reports indicating that various diseases responded to the Wassermann test in an alarming number of cases, and therefore detracted greatly from the value of the test. More recent opinions, based on an intensive study of cases during life and at autopsy, are now favorably inclined toward the value of the test, and its margin of error is considered small.

Our survey should afford considerable interest to those who have had no

first-hand knowledge of the relationship of the subtropical and tropical diseases to the application of the Wassermann test.

MALARIA

Refer to the table of diseases and note the incidence of the various forms of malarial fever and helminthiasis, and a combined group of patients brought to the hospital as a result of some form of "external violence." These three groups will furnish a good idea of the prevalence of syphilis, as well as offer some grounds for discussion and furnish a means of drawing one's own conclusion as to whether the test has been modified, in its application and results, by coexistent diseases. The general rate of syphilis for the entire list of people examined was 14.7 per cent of double-plus reactions, and 7.5 per cent of single-plus reactions, or a combined result of doubtful syphilitics of 22.2 per cent. If malaria, or any other disease, is to influence the result of the test to any practical extent, it should, in a large number of cases examined, reveal a considerably higher rate of positive tests than the normal incidence of the results obtained in a general survey, and any marked increase in the disease at different periods of the year should be accompanied by a rise in false results in the application of the test. Compare the net results of the tests in the cases of malaria, helminthiasis, and external violence, and one is able to see that the rate, if influenced at all, has not been materially changed. The group of external violence cases serves very well as a "yard stick" for this question of the coexistence of diseases, as well as furnishes an idea of how many cases of any disease are likely to be found associated with syphilis. None of these traumatic cases were suspects, but it is the practice to test them for syphilis, in order to be prepared to offer as good a prognosis as possible and to determine any feature present, not connected with the accident, which might delay healing.

A second method of comparing the relationship of malaria to the result of the test is to consider the monthly incidence of malarial patients admitted to the hospital with the monthly incidence of positive Wassermann tests.

Special interest attaches to the data in the following table:

	Monthly Incidence Malaria Cases	Monthly Incidence of Positive Wassermann Reactions (++) and (+) Per Cent
November (half month)	151	16
December	126	20
January	131	24
February	94	14
March	81	36
April	86	21
May	69	16
June	50	27
July	68	19
August	133	15
September	110	16

It will be noted that almost all of the high monthly rates of monthly responses to the Wassermann test occurred during those months when the malarial curve for admissions was smallest. We have so much malaria to treat that, if much variation in the test were caused by malaria, our rate of positive responses to the test should, to an appreciable degree, parallel the curve of incidence of malaria.

In this survey we have tested 315 malarial fever cases that had been diagnosed as positive, and our results showed a rate of positive responses of 10.7 per cent to the Wassermann test (combined ++ and + responses). During the same period we tested 84 cases who were patients as a result of machête wounds, gunshot wounds, railroad crushing, etc. To the Wassermann test this group gave a positive response of 10.7 per cent. This presumptive evidence certainly indicates that malaria offers no significant interference with the test. A word of caution, however, must be given: There are a certain number of malarial patients whose serum, if taken during a chill or about the time of a sporulation period, will respond in a positive manner to the test. Of several that I have tested during such periods, three have given positive responses at the time, but were quite negative at other times on several repeated tests. This condition is occasionally paralleled in other febrile diseases, as at the crisis period of lobar pneumonia and in the moribund stage of some septicemias.

HELMINTHIASIS

This clinical diagnosis usually means the presence of *uncinaria*, *trichocephalus* and *ascaris*, either alone or in some combination. Long-standing, heavy infestations producing cachexia will very infrequently give a transitory positive response of some degree, but as in other diseases, however, if one gets two or three positive responses in the presence of a complicating disease, the presence of syphilis is indicated, provided Yaws can be excluded.

FRAMBESIA (YAWS)

This is the only disease in our experience which gives a high rate of strongly positive responses. Some of them melt away rapidly under treatment, while others persist for a long time. It is comparatively easy to diagnose a case of secondary Yaws eruption, but the diagnosis of the primary stage, as well as of the tertiary stage, is more difficult. Since we cannot tell how long a reaction to Yaws persists in a case that has healed spontaneously, we are not in a position to say definitely to what extent statistics are vitiated as a result of this disease. Secondary Yaws has been found only ten times during the survey of these 1,434 people; therefore, if the other stages of Yaws are no more prevalent, our records are not greatly modified and our percentage on the true index of syphilis stands as fairly accurate. Our series reveals Yaws in 7 negroes, 2 Latin-Americans, and 1 white

American. The disease belongs to the coastal plains and islands of subtropical and tropical regions. It undoubtedly has something to do with the rate of syphilis ascribed to the negroes. Arthritic pains, headache and periosteal lesions can occur in Yaws just as they do in the clinical picture of syphilis. Most primary sores, if any history is available, prove to have an extra-genital location.

LEG ULCERS

These constitute common lesions among the young farm laborers. The general appearance and location are not usually the same as in the case of the common chronic ulcer, which is over the center of the shin, and which is usually considered syphilitic. In this series 77 leg ulcer cases were subjected to the test, and they showed 11 double-plus (++) and 6 single-plus (+) reactions, or a combined result of 22 per cent. Some few of these cases belong to the type usually ascribed to syphilis. Many of these positives, however, I believe to have been spurious reactions, for they were very unstable in subsequent tests. Most of these 77 cases of ulcer seem to belong to that class which so many term "tropical ulcer." I have been unable to find Leishmania bodies in any of them. No specific etiological factor was found in the tissues examined from the border and base of the lesion, unless the loosely woven spirochete which resembles *S. refringens* can be considered important. In every case examined thoroughly (16), this was found, and in abundance as a rule. I am not prepared to express a definite conclusion as to whether this is a primary, or even an important secondary, factor in the cause of the ulcer.

OTHER INFREQUENT, CONFUSING FEATURES

Occasionally during the survey, serum would either respond in a positive manner or show anti-complementary properties—usually the latter. One man had been tested every week for four weeks, and with a clean negative result each time; then he fell acutely ill and came into the hospital showing extreme jaundice. During this stay (period of jaundice) his serum had a strong double-plus (++) reaction. He died and was autopsied, but no sign of syphilis could be found.

Autopsy work during the period of the survey revealed latent syphilis in a few people whose test during life was quite negative. This condition occurs more frequently than many suppose, for in such instances the disease has burned itself out so that a reaction during lifetime is not very often obtained.

Alcoholism, so far as we can tell, has not affected the test on any member in the series.

The dark-field examinations have shown 6 cases which were positive, and which did not respond to the test (early primary sores). Other dark-field positives were also positive to the Wassermann test.

SUMMARY

1. The application of the Wassermann test (a Noguchi modified method) on half the admissions to Tela Hospital, during a period of ten months, shows the incidence of positive syphilitics to be 14.7 per cent, and that of doubtful syphilitics to be 7.5 per cent, or a combined result of 22.2 per cent among the 1,434 people examined.

2. The test can be applied with as much success here as in other countries if the small incidence of Yaws can be ruled out of the number of positive reactions obtained.

3. The negro race (West Indians, British Honduranians and Caribs) presents an incidence of 35 per cent syphilitics.

Local members of the white race tested show a rate of 22.1 per cent.

The Latin-Americans (the largest group tested, and containing many non-suspects) reveal a rate of 19.9 per cent.

4. The apex of the incidence of the disease by age groups fell into the period covered by third, fourth and fifth decades, but there were positives in every age group.

5. The rate was relatively less in the rural population, but the difference was not as striking as was to have been expected.

6. Dispensary visitors show a higher prevalence of the disease than the hospital patients, by a ratio of 3 to 2.

7. The commonest coexisting diseases with syphilis were the malarial fevers and helminthiasis. The only disease causing a well-defined, stable, confusing positive response to the Wassermann test was Yaws. This disease, so far as we can judge by our knowledge of secondary-stage cases of the disease, is not very abundant here, and when it does occur is nearly always to be found in the negro. It is not likely to be an important factor outside the coastal plain and island areas.

8. There appears to be a type of "tropical leg-ulcer" unassociated with syphilis as an etiological factor, which is quite common among our laborers, and which infrequently gives spurious positive reactions of some degree or other to the Wassermann test. This may be due to the activity in the ulcers of a spirochete resembling *S. refringens*. Usually these positive responses are transitory in character.

9. A false positive reaction to the test may infrequently occur in a jaundiced serum, but more frequently an anti-complementary result is obtained. False negatives can be obtained in very early primary, and very late tertiary, cases of syphilis, as shown by dark-field examinations in the first instance, and by autopsy disclosures in the second instance. Active, well-established syphilis can be depended upon to respond in a positive manner to the test.

10. It seems wise to repeat tests, so far as possible, in order that transitory responses of a positive nature may be ruled out under unusual conditions, such as sporulation periods in the case of malarial fevers, tropical leg-ulcers, pneumonia crises, etc. It is our practice to test each person in a duplicate manner in each "set up," using two antigens and two amboceptors against a control tube in each set of racks. When cases fail to respond in the same manner for each set of racks, or when there is anything short of a clean negative or positive reaction, the cases are tested again to determine whether the indefinite response is stable.
11. Indications for the test: Considering the fact that the Wassermann test is satisfactory when performed with a standard technic in the hands of an experienced, careful laboratory worker, and considering also the prevalence of syphilis and that many cases run a "silent course," it seems wise to make a general application of the test in all dispensary and hospital cases. Since there are many places not equipped to do such general work, the following indications might be of some assistance in the selection of subjects for the test.
 - (a) Patients with a history, or the presence, of a genital sore or scar. Acute lesions should be examined by the dark-field method.
 - (b) The presence of syphilis in a husband or wife should be taken to indicate the examination of both. If any children have been born since the disease was acquired, these also should be tested.
 - (c) Use the test as a guide in the treatment of positive cases.
 - (d) Individuals with a chronic, painless enlargement of the superficial lymph node sets.
 - (e) Obscure bone and joint symptoms (rheumatism) should lead to investigation by the use of the test, even in the absence of a history.
 - (f) Unexplained abortions, miscarriages, or ill-defined pelvic disease of women.
 - (g) Chronic disease of the cardiovascular system, cerebrospinal system, or the genito-urinary system.
 - (h) Obscure chronic diseases of the eye, ear, mouth, nose, throat, rectum and skin.
 - (i) Ill-defined diseases of any deep viscera, especially the liver.
 - (j) The test may be of assistance in the management of "injury cases," in which delay in healing and incomplete recovery of function may occur as a result of coexisting syphilis. This is important in claims for damages, when many such conditions are the result of the rôle which syphilis plays, rather than the nature of the injuries or the character of treatment in use.

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FREE RADIO-MEDICAL SERVICE

GEORGE S. DAVIS

General Manager, Radio Telegraph Department

The free radio-medical service was inaugurated by the United Fruit Company in connection with its hospitals and steamships, on August 1, 1922. This service is available, without cost, to merchant ships of all nationalities.

For the period August 1, 1922, to December 31, 1922, we handled 18 messages having a total of 542 words. During the year 1923 we handled 147 "Deadhead Medical" messages with a total of 5,292 words.

Perhaps the most interesting of the many cases was the following between our S.S. "Calamares" and S.S. "Lake Slavi," on June 25, 1923:

The "Calamares" left Havana for Cristobal, Canal Zone, on June 23, and on the following day (June 24) received the first call for medical assistance from the S.S. "Lake Slavi," owned by the Lykes Bros. Steamship Company, Inc., of New Orleans. The S.S. "Lake Slavi" was northbound from Colombia to Vera Cruz, with cattle. At the time the "Calamares" received the call from the "Lake Slavi," the latter was in the Caribbean Sea, about midway between Swan Island and Cuba. The nearest port available for medical attention was Tela,

Honduras, about 300 miles from the "Lake Slavi." At the time the first communication was established, the distance between the "Lake Slavi" and the "Calamares" was about 150 miles.

One of the important features in connection with the service rendered in this case is that, owing to prevailing atmospheric conditions (static), it would undoubtedly have been impossible for the "Lake Slavi" to obtain medical aid without delay, except from the "Calamares." There is, of course, a possibility that communication could have been established by the "Lake Slavi" with Swan Island, but in view of the atmospheric conditions this would have been problematical, and in any event, the service through Swan Island would necessarily have been slower than direct service with the "Calamares." As time was probably an essential element in this case, the fact that medical service was furnished by the "Calamares" is important.

The following are the messages that were exchanged between the two ships:

S.S. "Lake Slavi" (Am.) to S.S. "Calamares" (U. F. Co.—Am.) June 24, 1923. 10.20 A.M. Have man with gash two inches deep on right forearm, just below elbow; one or more arteries severed; have sewed up wound and applied tourniquet; and are bound for Vera Cruz; please advise treatment for next few days.

S.S. "Calamares" to S.S. "Lake Slavi," June 24, 1923. 10.39 A.M. Remove tourniquet, if bleeding has stopped, apply dressing of dry gauze, loosely bandaged; if bleeding occurs after removing tourniquet, the wound should be opened and bleeding stopped by tying the bleeding vessels, or packing tightly with gauze and applying a tight bandage.

S.S. "Lake Slavi" to S.S. "Calamares," June 24, 1923. 12.37 P.M. Thanks for advice. Am unable to stop flow of blood without tourniquet; main artery in pit of forearm severed; impossible to keep tied with ligature; will pack with picric acid gauze and iodoform powder; advise this O.K.; and if successful with this, will it do until arrival Vera Cruz Thursday morning?

S.S. "Calamares" to S.S. "Lake Slavi," June 24, 1923. 1.00 P.M. Use gauze bandage and iodoform powder for packing. If successful in stopping bleeding, it will answer till Thursday morning. If unsuccessful, try catching both ends of artery with forceps, allowing them to remain in wound with loose dressing around.

S.S. "Lake Slavi" to S.S. "Calamares," June 24, 1923. 2.40 P.M. Have succeeded in tying lower end of main artery, also lower end of small one near it, with white silk thread; unable to secure upper end; have packed same, and stopped flow of blood without tourniquet; will this answer without complication of serious nature till Thursday? Again thank you.

S.S. "Calamares" to S.S. "Lake Slavi," June 24, 1923. 2.57 P.M. I congratulate you on your success and nerve; no serious complication is to be feared. If sure bleeding has stopped you may again sew up wound; otherwise, let alone until Thursday, then carefully remove packing, and repack loosely and bandage.

S.S. "Lake Slavi" to S.S. "Calamares," June 24, 1923. 8.01 P.M. Patient resting easier, temperature 99, small seepage of blood, yet have hopes of stopping that; have full cargo of steers, Colombia to Vera Cruz, and patient was charged by one; am deeply grateful to you for advice.

S.S. "Lake Slavi" to S.S. "Calamares," June 25, 1923. 9.35 A.M. Patient still holding own; normal temperature, but quite weak; bleeding practically stopped.

S.S. "Calamares" to S.S. "Lake Slavi," June 25, 1923. 11.10 A.M. Weakness was to have been expected. I believe that you have control of the situation, and ordinary care will suffice until you reach Vera Cruz. Congratulations.

The foregoing series of messages exemplifies the value and importance of the radio-medical service, as this was a case which might have resulted in death had the radio service not been available. Furthermore, it shows a fine spirit of coöperation on the part of the ship's doctor, and a real appreciation of the service on the part of the master of the S.S. "Lake Slavi."

In a great many cases requests are received and a reply is made; but, often, as there is no further communication from the ship making the request, or from her owner later, there are no means of determining, in such instances, the complete value of the service.



Baseball Team, Panama Division

SECTION VI

NOTES ON SOME OBSERVATIONS MADE IN THE GUATEMALA,
TELA AND TRUXILLO DIVISIONS

DECEMBER, 1923, AND EARLY JANUARY, 1924

M. A. BARBER, M.D., United States Public Health Service

MALARIA AND ANOPHELES

1. PARASITE INDEXES

Collection of films made by hospital personnel and myself. Examinations by myself. Thick and thin films taken of each case. Thick film examined, and findings checked, where necessary, by the thin film.

GUATEMALA DIVISION

Class	Number Examined	Number Positive	Percentage Positive
Cherokee Camp, December 7, 1923:			
Adults, employees and non-employees.	40	11	27.5
Children.	8	3	35.0
Total.	48	14	29.2
Quiché Camp, December 10, 1923:			
Adults, mostly non-employees	20	8	40.0
Children.	9	8	88.9
Total	29	16	55.2
Creek Camp, December 12, 1923:			
Adult employees, men, now working	23	4	17.4
Children.	2	—	—
Total.	25	4	16.0

TELA DIVISION

Puerto Arturo Camp, January 5, 1924 (both sexes, all ages):			
Employed 1 year or more	33	10	30.3
Employed less than 1 year.	13	5	38.5
Non-employees, mostly women and children .	18	14	77.8
Not stated.	1	—	—
Total	65	29	44.6

Class	Number Examined	Number Positive	Percentage Positive
Same Group—Puerto Arturo:			
Children, 9 years and under	12	10	83.3
Women, mostly non-employees.	7	4	57.1
Total	19	14	73.7
Grand total, all examinations, all camps . . .	167	63	27.7
Children, all camps.	31	21	67.8
Known to be employees, nearly all men, all camps.	69	19	27.5

Races, nearly all Indians or Indian-Spanish mestizos. Of 10 recorded as negroes, 5 were positive.

TYPES OF PARASITE FOUND, ALL EXAMINATIONS

Camp	Estivo- Autumnal	Benign Tertian	Mixed Estivo-Autumnal and Benign Tertian
Cherokee.	8	6	—
Quiché.	9	5	2
Creek	1	3	—
Puerto Arturo.	17	12*	—
Total	35	26	2

*Possibly including one-quartan.

TYPES OF PARASITE, BY GROUPS

Employees, 1 year or more, Puerto Arturo.	3	7	—
Employees now working, Creek Camp	1	3	—
Non-employees, Puerto Arturo . . .	10	4	—
Children, all camps	13	6	2

Note the lower estivo-autumnal rate in a group of employees presumably receiving more quinine than the non-employees. The employees rarely had large numbers of parasites.

Cases marked "suspicious" of parasites, not reckoned as positives, were numerous. For example, if such suspicious cases were included as positives, the Puerto Arturo rate would be about 66 per cent. Such suspicious blood specimens showed granules, probably chromatin or other possible remnants of imperfect parasites. In cases of doubt I count such negative, but it is likely that a large proportion of them were really imperfect malaria parasites.

SUMMARY

1. It is evident that the indigenous malaria rate is high.
2. Employed adults show a lower rate than children and non-employed adults, and also show a relatively low estivo-autumnal rate, partly owing to greater amount of quinine treatment received by employees.

3. There is probably a difference in healthfulness of camps as regards malaria.

Numbers are small and laborers are more or less migratory, but comparison of somewhat similar groups in Puerto Arturo and in Creek would indicate that the latter is the less malarial.

RECOMMENDATION

That, since parasite-rate determinations of certain camps are likely to yield results of value, they should be continued. Dr. Clark has already conducted some of these. It is probable that the parasite rate will give more information than the children's spleen index, since children in most camps are too few to allow of accurate results. The parasite rate according to length of service or permanence in a camp would be preferable, since the error due to shifting of laborers from camp to camp, or in and out of employment, by the Company, would be partly obviated. It is possible that such rates may give some useful information regarding liability to infection in various camps, especially where more or less permanent populations can be compared. The comparatively low rates obtained by Dr. Clark at Tela Port and in Garcia's place are interesting. Economic conditions must take first rank in the matter of location of camp sites in new areas, but the malaria danger of a site, if known, might be a useful factor. Conditions may be different in very rainy seasons, but my few observations in December gave me the impression that a camp in the center of a large area wholly given up to banana cultivation may be less exposed to *Anopheles* than one near open, less cultivated land—an observation which requires confirmation, of course.

The number of malaria cases coming to the hospital from a given camp furnish valuable information as to the healthfulness of the camp, but should be checked, when possible, by information as to the previous residence of cases. I believe Quiché camp, which had a very high indigenous malaria rate, had been sending fewer cases to the hospital than Cherokee camp.

The determination of the incidence of different types of parasite is of value. It would be interesting to know whether the benign tertian is constantly higher in groups receiving more quinine, and whether there is an association of high estivo-autumnal rates with groups continually exposed to new infections.

It would be worth while to determine whether laborers contract most of their malaria on the plantations, or in their home farms or villages. Malaria surveys of towns not on plantations would be a useful thing for the International Health Board people to conduct. I believe Dr. Elmendorff, of Guatemala City, has made some surveys in Guatemala.

While negroes may seem to suffer less from malaria than other races, their parasite rate may be high, and it would be worth while to get the parasite rate of a group of them.

Quinine is probably the best means to be employed under present conditions. It seems to me that the company is doing a useful work in teaching laborers and their families the value of this remedy. Dr. Macphail told me that formerly it was difficult to get people to take quinine, but that now they take it readily enough when they are ill. In camps where the shifting of population is the least, would it be profitable to furnish quinine free or at low cost to non-employed women and children?

2. MOSQUITO SURVEYS

Anopheline identifications were checked by Mr. W. H. W. Komp, and the Culicine determinations were all made by him.

ADULT ANOPHELES

GUATEMALA DIVISION

In the camps many examinations were made in and under houses, in out-houses, and in empty barrels and the like. In the jungles, hollow trees and other likely places were searched. Adult Anophelines were remarkably few; Culicines were numerous.

Anopheles caught, adult stage:

<i>A. albimanus</i>	7
<i>A. pseudopunctipennis</i>	2

Nearly all adults seen were caught, so it is evident that numbers were very small. Nearly all *A. albimani* were found trapped in bed nets, most of them in the Bobos district.

Anopheles larvæ:

Fairly numerous in a few seepage pools, mostly along railroads, though a few elsewhere—occasionally one found in jungle swamps. Total production at that season was apparently small.

Bred out:

<i>A. albimanus</i>	2
<i>A. pseudopunctipennis</i>	9

Culicines numerous:

In a long search for *Aedes ægypti*, none was found. Very few domestic receptacles containing rain-water were found.

PUERTO BARRIOS

No Anopheles adults were found, but only a short search was made. Anopheles larvæ were found in the wet ground near the commissary building, in brackish pools and along the railway. They were found in a considerable number of places, but total number found was small, even in permanent borrow pits where

breeding conditions seemed to be excellent. Culicine larvæ were abundant everywhere. *Aedes ægypti* was found once in company camp, but this species was not numerous.

PUERTO CASTILLA

A survey was made of swampy ground near the main laborers' town and along the railroad. *Anopheles* larvæ were fairly numerous in shallow, slightly brackish pools near the camp. Production appeared to be large, judging from the number of larvæ and extent of breeding places, but no adults were found in a short search in and under houses, in a deserted boat cabin, and in hollow trees in the woods.

Bred out from pools near sea level:

<i>A. albimanus</i>	7
<i>A. crucians</i>	2

There seems to be no doubt as to the identification of the *A. crucians*, but specimens will be sent to Washington for confirmation. Possible first report is made of *A. crucians* from this coast. It has been reported from the West Indies, and might have been transported by ships to Puerto Castilla. If a recent arrival, it will be interesting to note whether this species increases there materially.

TELA PORT, NEAR COMPANY "TOWN"

Scarcely any *Anopheles* larvæ were found, although a number of apparently favorable breeding places were examined. A few *Anopheles* larvæ were discovered in a pool near the railroad and across the river. No adults were found.

PUERTO ARTURO

Anopheles adults were more numerous in the main laborers' quarters than in any other camp examined. They were about as numerous as in negroes' houses in the Mississippi Delta, but there were relatively few in a stable or under houses that were examined.

Caught:

<i>A. albimanus</i>	15
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Anopheles larvæ were found in many pools and in a small stream in a pasture near the laborers' quarters, but few in any one place. They were more numerous in driftage at the edge of the neighboring lagoon, the water of which is now fresh, or very nearly so. Terrain was favorable for a large production of *Anopheles*.

Bred out:

<i>A. albimanus</i>	6
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GUATEMALA CITY

Survey was made with the assistance of Dr. Elmendorff. Terrain was dry, but a number of places where *Anopheles* ought to breed were examined. Not one was found, although *Culicines* were numerous. Temperature was favorable for *Anopheles* breeding, judging by our findings in winter in the southern United States.

Culicines thus far identified, all regions:

Psorophora posticus

Culex tarsalis

Culex leprincei (?)

Culex similis

Mansonia titillans

Aedes ægypti

SUMMARY

In December and early January the number of *Anopheles* seemed remarkably small, as compared with those in somewhat similar regions in the Philippines, the Malay States and the southern United States. In only one camp, Puerto Arturo, were adults found in any considerable numbers. No considerable breeding of larvæ was found except at Puerto Arturo, and possibly at the swamp at Puerto Castilla. *Culicines*, both larvæ and adults, were numerous almost everywhere. The breeding and resting habits of *A. albimanus* and of *A. pseudopunctipennis* may differ from those of species found in other regions mentioned, and it is quite possible that a longer search might have revealed greater numbers; but their scarcity seemed to me remarkable. I believe I could see as many adult *A. quadrimaculatus* in two hours near Stuttgart, Ark., as I could find of *A. albimanus* or *A. punctipennis* in a month in Guatemala or Honduras, judging by December and January findings there. The low anopheline rate seems the most remarkable in view of the high malaria index. Possibly *Anopheles* are much more numerous at other seasons or in other localities, and it may be, as Dr. Darling suggested, that *A. albimanus* confines its attacks almost wholly to man. As regards a possible reduction of malaria with increase of domestic animals, it is interesting to note that Puerto Arturo, where cattle have been kept for some years in considerable numbers, had a relatively high anopheline and malaria rate.

3. DISSECTIONS OF ANOPHELES

The guts of six *A. albimanus* caught in a bed net in the Bogus district were examined for malaria parasites. All specimens were negative.

4. PROBABLE VALUE, ON THE PLANTATIONS, OF CERTAIN ANTI-MALARIA MEASURES

a. *Quinine* (Discussed under 2.)

b. *Creosote as a Mosquito Repellent in Houses*

In the type of building in which air circulates freely beneath the sheet-iron roof, I would not expect the repellent power of creosote to be long-enduring, and the repellent would probably have to be renewed every few days. This I should conclude from some experiments we conducted last summer in creosoting a relatively open building. In buildings closed at night, and often a good part of the day, such as negro cabins on the cotton plantations of the Mississippi Valley, a creosote application retains its repellent power much longer, and some of your palm shacks, if not too open, might show good results. There are some quarters at Puerto Castilla, at the port itself, where there is a good opportunity of testing the repellent power of creosote against both mosquitoes and sand flies. We shall be doing work this summer on repellents and I shall send some samples to Dr. Winn for trial. In order to determine the effect of creosote or of any other repellent on the malaria rate one would, of course, seek for a locality in which there is the least shifting of personnel among the laborers.

c. *Screening*

Dr. Macphail has given me an account of the difficulties met with in screening the dwellings of a people so little educated to the importance of screens as the laborers in Guatemala. But it might be worth while to try screening again, among a small group of people of a more intelligent class, such as Jamaican negroes. Judging from observations made among the negroes of Arkansas, I should expect the Jamaicans would value their screens enough to take care of them, and even that less intelligent people would come to want them also. In any case, however, much as well-cared-for screens excel those poorly cared for, in the prevention of malaria, it has been my experience that poor screens are much better than none at all. Whether in plantations such as yours extensive screening of laborers' quarters would pay, in reduced hospital rates or in attracting or holding better laborers, I am not prepared to state. But I should think it worth while to conduct a one-camp experiment with some more intelligent group of laborers.

d. *Drainage and Larvicides for the Reduction of Anopheles*

Except in the vicinity of larger populations and on a limited scale, it is questionable whether these measures would pay on the plantations. Under some special conditions where breeding of *Anopheles* is limited, they might

do; and in such cases one would need to determine whether the breeding place in question is the source of any considerable amount of infection.

e. Larvae-Destroying Minnows

I found such minnows occasionally, but their numbers seem small as compared with those of *Gambusia* in this Louisiana region. If *Gambusia* were acclimated in some such region as Puerto Arturo or Puerto Castilla, some reduction of mosquitoes would probably follow—whether enough to be worth while or not I could not say. It would seem to me worth a trial, for this species, once started, spreads rapidly. Mr. Hildebrand states that *Gambusia* thrives in brackish water. Probably you have already tried out this measure.

5. NOTES ON CERTAIN LOCALITIES

PUERTO BARRIOS

This is at present probably the least sanitary of the United Fruit Company places I visited. A radical improvement could be brought about by filling in, somewhat as in Puerto Castilla, but conditions may not be such that this sort of improvement is possible, even if financially within limits. Some immediate improvement at relatively small cost could be made by clearing out and extending the drains, cleaning up around the slaughter house, and by keeping a close watch on the breeding places of yellow-fever mosquitoes. At Port Swettenham, F. M. S., which Puerto Barrios somewhat resembles, dykes and tide gates were employed; but there I believe the ground is somewhat higher above the level of low tides.

PUERTO CASTILLA

The breeding of *Anopheles* close to the laborers' town would seem to be a source of danger. It may prove that clearing away the jungle will alone prove a remedy, but this is hardly to be expected unless there is a sea breeze for a large proportion of the time. A radical cure could be effected through continual filling in with sand. Of larvicides, Paris green probably is the best. Dr. Winn suggested pumping in sea water, but I should think that, before this is done on a large scale, it would be well to try it in a pool or two. The Malay States brackish-water breeders seem to be little incommoded by the salt water coming in during high tide. Before any great expense is incurred, it would seem to me worth while to determine, through blood examination, what the malaria rate is among the more permanent residents of the quarters. If the rate should prove permanently low, it is possible that nothing radical would have to be done. Mosquito traps, consisting of poorly adjusted bed nets with human bait, would help to determine whether the anopheline production is considerable.

PUERTO ARTURO

There is every indication of a high malaria rate in the main laborers' camp. The relocation of the camp on higher ground, farther in the direction of Tela Port, is worth considering.

6. YELLOW FEVER AND AEDES

The scarcity of *A. ægypti* in the vicinity of Quirigua, even in water where they would be expected, has been noted. It would be interesting to know how far this species can be reduced by preventing its breeding in domestic rain-water receptacles; and whether it persists in any large numbers in the leaf-axils of plants in the vicinity of houses during dry seasons. My very scanty observations would indicate that this species has become scarce about the Guatemala camps, and it may be that it tends to die out when domestic water-receptacles are kept empty. Mr. Komp suggests that a rain-water receptacle be kept open as a trap, to discover whether breeding of *Aedes* begins in it—the trap to be watched, of course, in order that no imagoes may be formed in it.

7. LOW DYSENTERY RATE

The low rate, both bacillary and amebic, in the hospitals seems to me remarkable. Camp water-supplies are generally good, but laborers move freely from the camps to the native towns where water often must be poor. Dr. Macphail told me that he once had a number of severe cases of bacillary dysentery occurring at about the same time, but in widely separated localities. Mr. Rayor suggested that possibly all had recently visited Guatemala City, or some other place where dysentery is prevalent. Dr. Winn suggested that possibly buzzards might carry this or other intestinal diseases to roofs, by means of the carrion that they eat, and that some of this unclean material could be washed from the roofs into tanks used for potable water. Both theories would seem to me worth looking into, should such epidemics recur. Conditions in the camps do not seem to favor a rapid spread of dysentery. It would be an interesting piece of work for some epidemiologist to determine the number of carriers of amebic or bacillary dysentery in that region; possibly they are no more numerous than they are now said to be in England or the United States.

8. PNEUMONIA

It might be worth while to note whether there is a high rate in this disease among laborers who have recently served in military camps. The effect of temporary military service on the incidence of other transmissible diseases would also be worth attention.

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